



(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
04.01.2012 Bulletin 2012/01

(51) Int Cl.:
D06F 23/04 (2006.01) D06F 37/24 (2006.01)

(21) Application number: **09833672.0**

(86) International application number:
PCT/MX2009/000139

(22) Date of filing: **18.12.2009**

(87) International publication number:
WO 2010/071396 (24.06.2010 Gazette 2010/25)

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK SM TR

(30) Priority: **19.12.2008 MX 2008016451**

(71) Applicants:
• **Guerrero Lara, Blanca Estela**
C.P. 03100 México, D.F. (MX)
• **Guerrero Parra, Salvador Virgilio**
C.P. 03100 México, D.F. (MX)
• **Guerrero Parra, Gilberto Manuel**
C.P. 03100, México, D.F. (MX)

(72) Inventors:
• **Guerrero Lara, Blanca Estela**
C.P. 03100 México, D.F. (MX)
• **Guerrero Parra, Salvador Virgilio**
C.P. 03100 México, D.F. (MX)
• **Guerrero Parra, Gilberto Manuel**
C.P. 03100, México, D.F. (MX)

(74) Representative: **Urizar Anasagasti, Jesus Maria**
IPAMARK, S.L.
Paseo de la Castellana 72 1°
28046 Madrid (ES)

(54) **IMPROVEMENTS TO A PUMP-TYPE LAUNDRY WASHING MACHINE**

(57) This invention is a vertical machine for washing and wringing clothes by mean of a closed pumping circuit which supplies the washing or centrifuging system. T washing system uses a special exhaust which produces a cavitation effect above the clothes, combined with a rotary washing system which produces the paused circulation of the clothes; the rotation of the washing system is produced by the same water flow. The centrifuging is made in the inner tub impelling its rotation by means of a turbine, thus the tub rotates over the virtual axis which passes through the center of gravity thereof and the clothes for being wringed, furthermore is used a special annular chamber for auto-balancing. The rotation of the tub over the virtual axis is achieved making float the inner tub by means of the special supports which combine the speed components of any point of the tub. The basic ideas of the above concepts are applied in different practical versions, as well as with modifications to a horizontal axial axis or front-loading washing machine or an industrial washing machine.

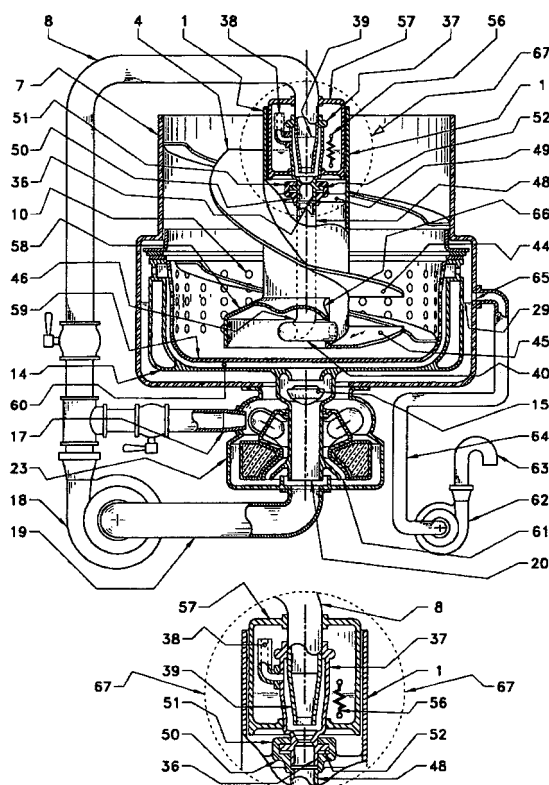


FIG. 3

Description

BACKGROUND OF THE INVENTION

[0001] The current vertical washing machines of clothes use agitators, either of the oscillating type or propeller type, to scrub the clothes and produce streams inside the washing tub which pass through the fabric and try to loose the particles adhered thereof; but these streams are not stronger and effective to go through the innermost fibers of the threads, therefore the time of washing can be more prolonged and to spend more energy of the necessary. These washing machines require mechanisms of machined transmission and speed reduction to produce the oscillating motion of the agitation impeller or in the case of propeller thrusters; these tend to entangle so much the clothes. In addition, during the wringing of the clothes by centrifugation, the tub rotates supported by a fixed central shaft; this makes difficult the balance during the rotation.

[0002] This invention is an improvement to the patent No. 5.953.939 registered by the authors of this in the United States of America. The purpose of this invention is to improve the machines for washing, rinsing and wringing clothes; in addition to take advantage in some way the phenomenon of cavitation for a more efficient washing. The invention is referred to a machine for washing clothes by means of a recirculating pumping system, which uses a special exhaust to produce cavitation inside the washing tub and, for the wringing it has a self-balanced rotation system which makes that the tub turns on the virtual shaft which passes through the centre thereof. With these improvements the purpose is to obtain a deeper and uniform washing, to circulate the clothes by the cavitation area inside the tub; besides to decrease the losses of pressure in the hydraulic circuit. Also, as variants, it is showed how to apply all these new ideas to a horizontal or front load washing machine and an industrial washing machine.

[0003] In this document are presented the basic ideas of the invention and their variants, with the purpose to combine in the most practical way the most ideal to get a washing and wringing machine which increases the efficiency and speed of washing, and saving time and energy during its operation.

DESCRIPTION

[0004] In the following description and in the attached drawings the characteristics of the invention are detailed, indicating the portions of this one with the same reference signs as in the description as in figures; the portions with equal function on the different figures are marked with the same number in each of them.

Figure 1 represents a first version of the washing machine, in which is described, in general, the recirculation pumping system which is used for squirting

inside the washing tub and propelling a turbine which, by means of a speed reducer, it moves a rotary washing system which produces the circulation of the clothes inside the washing tub. Furthermore, it is showed the centrifuging which makes rotating the floating tub on the virtual shaft passing through its center of gravity. By simplicity, the exhaust system is not showed.

Figure 2 shows a special exhaust and a rotary washing system which is impelled by a jet reaction; this jet is sent towards a dragging zone to push the clothes inside the tub.

On Figure 3 is observed a first version of the use of the rotary washing system of Figure 2, as well as a first form to arrange, staying fixed on the system, the special exhaust and the steam chamber which feeds it to produce steam bubbles which produce cavitation in the sine of the washing tub.

Figure 4 is a variant of the rotary washing system of Fig. 3, used to reduce friction losses in the pipeline. In this version, The exhaust rotates along with the rotary washing system, while the steam chamber remains fixed, therefore it is inserted a rotary sealing system, mechanical-type seal, on the tube which drives the steam between the static steam chamber and the suction of the exhaust rotating.

Figure 5 is other similar system to the previous, in which the steam chamber and the exhaust rotate together to avoid the use of a rotating seal, besides employing a planetary reducer to transmit the rotation to the system.

Figure 6 describes a mechanism so that the rotating of the washing system being paused.

In Figure 7, the feeding to the rotary washing system is made below of the tubs. In this case, the rotary washing system moves laterally together with the centrifuging tub, during this cycle; therefore Fig. 8, as continuation of Fig. 7, shows mechanisms to allow the displacement in the case of using a speed reducer.

On Figure 9 the same system of Fig.7 is showed, except that in this figure the rotary washing system remains centered with the geometric shaft of the washing machine and the steam chamber is fixed.

Figures 10 and 11 describe a system for better balance of the centrifuging tub.

The Figure 12 is a mechanism, in addition to the flotation system, to support the tub during the centrifuging cycle in its free rotation, on any virtual shaft

passing through the center of gravity of the tub and the clothes for wringing.

Figure 13 is a variant of figures 7 or 9, which uses the support of Figure 12; and a pump is used for the washing pumping circuit and another pump for centrifuging cycle; both pumps impelled by the same motor.

On Fig 14 is showed a system to eliminate loose threads coming out of clothes.

On Figure 15 is illustrated how to implement the new washing and centrifuging system described in the previous figures, in a new washing machine of tube or cylinder type or horizontal shaft or frontal load type cylinders.

Figure 16 is equal to Figure 15, except that the washing system changes a little.

On Figure 17 is used the basic idea of Figure 12 to the case of Figures 15 or 16; and Figures 18 and 19 are variants of the same idea applied to a washing machine of vertical axial shaft as of Figures 7, 9 or 13.

On Figures 20 or 21 is used the system of Figures 18 or 19 for a version of the washing machine of Figure 3 with less losses.

The Figure 22 is an industrial washing machine for washing large quantities of clothes, and Figure 23 is the wringing system of the washed clothes in the system of Fig. 22. Figure 24 is a second version of the industrial machine of Fig 21 in which the wringing is made by centrifuging the clothes.

Figure 25 is a version of Figure 9 and Figure 26 is an optional system of a planetary speed reducer which produces an oscillating motion which put together the blades to produce the circulation of the clothes inside the tub.

[0005] Support structures, controls, cabinet, etc., for simplicity are not showed in the figures.

- **Returning to Figure 1**, it is seen that the new washing machine has a main tub (7) within which is placed an internal tub (14) which has about half of the height of that the nodding of the internal tub being when it rotates floating, within the main tub, with the clothes to squeeze seated at its core, within the main one. A closed annular chamber (28) forms the side of the internal tub (14) and contains, as a counterweight to balance on the centrifuging cycle, a certain amount of a heavy and fluid material, such as a kind of liquid or small spheres of smooth material. The internal tub is housed in a broadening of the lower half of the

main tub (7), so that the diameters of both tubs are sufficiently matched. The peripheral separation between the broadening stage of the main tub and the upper edge of the internal tub is covered to avoid the passage of clothes, by a kind of annular floodgate (31) with section on "L"-shape, whose vertical portion adjusted slightly adjusted to the inner of the main tub; and the horizontal portion is supported by own weight, on the upper edge of the internal tub. The horizontal portion of the "L" has pasted below a plate (30) of antifriction material, which seats and slides on another plate (30) of the same material fixed at the upper edge of the internal tub, when it rotates.

[0006] In the center of the core of the internal tub (14) it is lifted up a wide vertical tube (11) which terminates, at its upper, in the box of a planetary speed reducer (2) and, through the tub, it is extended downward into another tube (20) to drain the water from the tub. Under the core level of the tub, a vertical and axial turbine (26) is within a broadening, on casing shape of the vertical tube (11) so that the turbine shaft (32) impels to the planetary reducer and entering to this through a bearings box (33) with seal against leakage of the lubricant. On the other hand, centered shaft (34) of the reducer output (2) is welded, by above of this one, to the center of the upper lid (35) of a second wide tube or central hollow post (1) hereinafter called central post. This central hollow post is outer, concentric and freely adjusted to the wide tube width (11), also it is hermetically closed only in its upper portion with such lid (35); around this central post are fixed one or two helical plates (4) which to rotate the post they serve as screw, to be pushing the clothes downward. Also are fixed to the central post (1), at the bottom of the tub, radial blades (12), which when rotate through towards the periphery the clothes which are falling to the bottom of the tub. The central hollow post, the helical plate welded to it and the system which makes rotate to both to move the clothes inside the tub, form the rotary washing system, in this figure and following.

[0007] The washing and rinsing cycles are made by means of a closed circuit of pumping. The circuit consists of a pump (18) placed under the tubs and with its discharge connected, through the tube (8) and the control valve (13), to a nozzle (6) or a special exhaust (not shown in the figure by simplification) which discharged in suitable direction a strong water jet inside the tubs. By the orifices (10), that both tubes, (11) and (1), have at the upper of their periphery, the water flow continuously gets out of the internal tub through central tube (11) and the tube of evacuation (20) to impel the rotation of the turbine (26). By means of the speed reducer (2), the rotating motion of the shaft (32) of the turbine is transmitted, with smaller speed and greater force, to the hollow central post (1) to move the clothes with the blades and the helical plates. The upper of both tubes lacks of orifices and is closed in order to when fill with water the tub a compressed air chamber (3) be formed within them which

prevents that the water reaches to the system of the reducer. In order to facilitate more the movement of the clothes, the tubs have in their inner periphery other helical plates (5) which, with the circular motion of the water flow within the tub, cause that the clothes tend to ascend by the sides of the tubs.

[0008] The water which gets out of the turbine discharge continues flowing through the tube of evacuation (20) of the internal tub and, getting out of this one, it enters directly to the suction tube (19) of the pump (18) that returns the water flow to those to complete the closed circuit of pumping.

[0009] The wringing cycle is carried out through the centrifuging of the clothes. For this, it is started by evacuating the water of the tubs by means of some draining system, not indicated on fig. 1, until the water level decreases as far as below of the bottom of the tubs, so that the water which is in the internal tub (14) gets out through the retainer or check valves (27) at the bottom of the tub. To finish evacuating the water at such level, becomes to introduce water so that the space between the two tubs be filled until certain predetermined level (29); due to the retainer valves (27) of the internal tub, the water will be not introduced again in this tub, which will be floating in the water that there is between both tubs. The evacuation tube (20) of the internal tub also has a retainer valve (15) with floating plugger, which serves to when introducing again water between the two tubs and during centrifuging the same water it does not enter again for this tube to the internal tub.

[0010] Floating the internal tub, this is rotated by means of a special turbine special and similar to a horizontal turbine Pelton-type. This turbine consists of a vertical box (25), of almost cylindrical shape, which is centrally joined at the bottom of the tub or to the vertical evacuation tube (20) and is crossed by this one; at the side of the box are introduced at the half a distributed series of simple cavity-radial buckets (24) slightly tilted downwards with similar form to a ladle curved almost 180°, which allow free way to the inner of the box only through their cavities. Moreover, as it is observed in the cutting AA', the internal edges of the buckets (24) are directed and finish in a series of holes (21) which the evacuation tube (20) has in its side of that zone, thus the water of the jets that impel to the buckets is discharged by such holes within the tube. These water jets are thrown by a series of nozzles (17) on the cavities of the tangential-shape buckets; therefore the impulse applied on the buckets by the jets produces the rotation of the internal tub (14)

[0011] To make work the turbine described on the above paragraph, the control valve (16) of the nozzles (17) connected to discharge of the pump (18). The water flow which impels the turbine is drained by the evacuation tube (20) on the input of the suction tube (19) of the pump (18), so that this same flow being pumped again towards the nozzles (17), and be established the closed circuit which keeps the rotation of the turbine of pumping The

water which wets the clothes and is centrifuged is evacuated of the internal tub by the holes (9) of the tub which are above of the flotation level. All the system which produces the rotary impulse of the tub is lodged in a cylindrical casing (23) or centrifuged chamber which is centrally joined to the bottom of the main tub (7), as a continuation of this one, and whose bottom is connected to the suction tube (19) of the pump.

[0012] Since the internal tub (14) does not rotate supported by a rigid shaft which supports this in its geometric center, this shall rotate, due to its flotation, on the virtual shaft which passes through the center of gravity of the set of the tub and the clothes for being wringing. Although the internal tub (14) rotates in balanced form or without vibrations on this virtual shaft, if the clothes are not symmetrically distributed inside the tub, the virtual shaft displaces from the geometric shaft, causing that the tub shakes and oscillates by not rotating on its geometric shaft; therefore it may hit or rub with the mean tub (7). This undesirable effect is diminished by means of the fluid and heavy material contained in the closed annular chamber (28) which forms the side of the tub (14), since when beginning to rotate the tub the liquid within this chamber is accumulated from the side opposed to the slipping of the virtual shaft respect to the geometrical. When the weight of the accumulated fluid in a side of the chamber counteracts to the unbalanced weight of the clothes in the opposite side, the distance between the virtual rotary shaft and the geometric center will decrease, although it will not be null and it will be in an intermediate point, since when approaching to these shafts it is redistributed, until certain point, the fluid inside the balance chamber (28), but improves the oscillation and the shaking. Between the sides of the tubs are placed bearings with shock absorbers, not shown in the figure, to support frictions and small impacts between the tubs. Later on, some methods are indicated to avoid the redistribution of counterweight fluid.

[0013] So that the flotation of the internal tub inside the main tub be stable, is added a floating counterweight (22) in the lower end of the evacuation tube (20); in this form the meta-center keeps fixed between the floating centre and the center of gravity of all the system of the internal tub, including wet clothes.

Figure 2 illustrates a rotary washing system, similar to that described in the above figure, which uses the impulse of a jet reaction to rotate the central post with its helical plate, in such a way that the rotation of the post is combined with a positive push of the same squirt upon the clothes, in order to cause its movement into the tubs and its circulation through the area where cavitation occurs. In the same drawing is described the aforementioned special exhaust.

[0014] In the upper portion of figure 2 the device is observed de device to produce the positive push on the clothes, which consist of a dragging zone of the clothes

limited by two warped surfaces, (44) and (45), separated to some distance facing each other, with opposing curvatures and certain convergence degree between both; in such a way that the clothes, which are in the limited space by both surfaces, can undergo a push or effective drag by a water jet that flows between both surfaces in direction of the convergence and which gets out of a nozzle, a tube or from the exhaust illustrated in the same figure, as a jet producer in this case.

[0015] Also in the upper portion of the figure it is seen that the special exhaust is comprised, firstly of a conical tube or Venturi (39) fed by a tube (40), which increases the speed and lows the water pressure to a negative pressure. The outlet end (41) of the Venturi, of smaller diameter, is enclosed and surrounded by a small closed cylindrical box or suction chamber of the exhaust (37) communicated, through a small suction tube (38), with the upper portion of a closed chamber (57) (fig. 3), described later, where low pressure steam is generated. The suction chamber (37) ends in an output tube (36) with an equal diameter to the final outlet diameter (41) of the Venturi and aligned with the output of this one; in order to absorb the steam there is a very small clear (42) between the final extreme (41) of the Venturi (39) and the initial extreme of the output tube (36). The output tube (36) of the exhaust has in its beginning a short and small internal contraction that form the throat (43) of the exhaust and then it keeps its normal diameter at full length, to keep the vacuum pressure produced by the Venturi and the throat, contrary to a normal exhaust which ends in a diffuser. The water fed by the tube (40) to the Venturi (39) of the exhaust and the steam sucked by this from the steam chamber are launched by the output of the exhaust (36) in a jet of water mixed with steam bubbles a vacuum pressure, which collapse due the atmospheric pressure to be discharged into the tub, causing implosions and shock waves which wash the clothes.

[0016] In the bottom of Figure 2 is showed the system that produces the impulse to rotate the center post (1) with its helical plate (4), by the jet reaction in a rotary tube (48) fed by the fixed tube (8) connected to the pump discharge. To the left of the bottom of the figure it is observed a first type of rotary coupling between these two tubes, which allows the rotation of the first one over the second one, consisting in introducing some distance to the end of the feeding tube (8) within the rotary tube (48), with a fine adjustment between both, as a pillow block. The axial displacement between both tubes is limited mounting on the fixed tube (8) a brake shoe (52), in disc shape with smooth surfaces, which is linked or slightly imprisoned between a pair of discs or rotary plates, also with smooth surfaces, which are joined or linked to each other in their periphery. The upper plate (51), with a bushing slightly fitted to the fixed tube, it supports the rotation of the system on the upper surface of the brake shoe (52) and the bottom plate (50) is joined to the rotary tube (48), in order to support it.

[0017] Another version of the rotary coupling between

the fixed tube (8) and the rotary tube (48) is illustrated in the drawing to the right of the previous version. In this case, the fixed feeding tube (8) ends in a cylinder (54), wide and hollow, which at its inner has screwed the external diameter of a large bushing (53), which serves as a pillow block to the rotation of the rotary tube (48), for which the upper end of this tube is introduced within the bushing with a fine adjustment. This bushing (53) is smoothly fastened, in its inferior face, by a brake shoe (52) mounted on the rotary tube and, in its upper face, by another screwed bushing (55), as a nut, in the end of the same tube.

[0018] In the left inferior portion of Figure 2 it is observed that the vertical and centered rotary tube (48) within hollow post (1), has in its bottom a first (46) fold to 90° and it continuous, after to get out by a hole at the post, with a second (47) horizontal fold, also near to 90° which places to the end (40) of exit of the tube on perpendicular position to the rotary shaft of the own tube, and some distance from this shaft and directing the water jet which launch by such end towards the dragging area, formed between the surface (44), terminal of the helical plate (4), and the surface (45) of another inferior plate welded to the same central post (1), in order that the water jet drags the clothes which pushed by the rotation of the helical plate, they gradually stay on this space.

[0019] The distance and perpendicular direction with respect to the shaft of the rotary tube (48), with which the water jet gets out by the end (40) of the same tube, according to their folds to 90°, it causes that this jet, by reaction, pushes the end of the tube backwards and impels the rotation of this. The transmission of the rotation of the rotary tube to the central post can be directly done, joining with arms (49) the post to the rotary plate (50) of the tube, or by means of a speed reducer to increase the torque and to reduce the speed of the central post, so that the helical plate (4) is moving the clothes towards the dragging zone.

The figure 3 is a washing machine by recirculating pumping with washing and centrifuging systems similar to those described in Fig. 1, except that the rotary washing system is impelled with a tube which rotates by jet reaction, as the described in Fig. 2; in addition, it is showed the use of the special exhaust in the rotary washing system and the disposition of the steam chamber (57) which produces this to negative pressure. In this case the steam chamber and the exhaust remain fixed, joined to the feeding tube (8), to be able to directly connect the electrical power to the resistance (56) that heats the water in the steam chamber and feeding directly the produced steam to the suction chamber of the exhaust. At the bottom of figure 3, it can be seen an amplification (67) of the exhaust and the steam generating system, which are indicated with the same number (67) at the upper of the tub (7).

[0020] The feeding tube (8) for the washing centrally gets into the inner of the tubs, (7) and (14), by above of these, and it is directly connected with the conical tube or Venturi (39) of the special exhaust, in such a way that this together with its suction chamber (37), crosses and keep centrally lodged inside the steam chamber (57). The steam chamber is a cylindrical box, hermetically closed and lodged within the central post (1), wherein the water is heated by means of the electrical resistance (56) to generate steam to the low pressure of the exhaust; this steam is suctioned by the suction chamber (37) of the exhaust through the small tube (38) whose nozzle stays at the upper of the steam chamber to draw in only this. Below the core centre of the steam chamber (57) the output tube (36) outstands of the exhaust to coupling, by means of the support brake shoe (52) and the rotary plates (50) and (51) as in Fig. 2 with the rotary tube (48) which keeps the same small diameter of the output tube (36), to keep the high speed and the low pressure of the water and steam flow produced by the exhaust, as it was mentioned. Joined by and arms (49), the rotary tube (48) drags in its rotation to the central post(1); furthermore the bottom and the folds (46) of the same tube are housed within a broadening of the bottom of the central post o cover (58) in bell-shaped, in order to avoid that the clothes stuck with such folds. The end (40) of the rotary tube (48) outstands of the cover (58) by a hole in a radial and vertical plane (66) that interrupts the bell shape, so that the water jet and steam bubbles, which are discharged by such extreme, go towards the dragging area formed between the surface (44) of the helical plate (4) and the plate (45), wherein the bubbles are collapsed causing shock waves which wash the clothes.

[0021] Within the internal tub (14) another additional tub is placed (59), separated a little and with a series of holes (10) by which is leaving the water that the tube (40) discharges within the internal tub. Through the space (60) between the cores of the two tubs, the water goes out of these through a evacuation tube (20) which begins from the core center of the internal tub (14), and it extends downwards until ending very near, upon the input of the suction tube (19) of the pump (18), to complete the closed pumping circuit during the washing cycle.

[0022] In order to fix the flotation level (29) in Figure 3, firstly the water of the tubs is evacuated (62) by means of a small pump (62) which discharges (63) to the general drainage and whose suction (64) is connected to an output (65) of the main tub (7), which is at the side of this to the same height that the prefixed flotation level (29). When the water level comes at the height of the opening (65) cannot be continued evacuating the water and the level (29) of the same one does not get down anymore; in this point, main pump (18) starts and begins to suck, through its suction tube (19), the water of the centrifuging casing core (23) simultaneously that it discharges this same water in jets launched by the nozzles (17) upon the Pelton turbine, which begins to rotate and return the water used to the core of the casing (23) through the tube

(61), coaxial and external to the tube (20), to be recirculating again by the pump. Since the water passage of the evacuation tube (20) to the suction tube (19) is more direct, this one will suck more water of the inner of the tube (20) that water evacuated by the turbine. Thus, the tube (20) will be emptied at certain volume, same which will go out from the internal tub (14), but it could not retake it due to retainer valve (15) inside the own tube; in this way, the volume of water evacuated of the internal tub increases, in equal amount, the volume of water which there was between the two tubs, therefore the water level between them will increase, exceeding the opening (65). In this condition, the draining pump (62) come back to work removing the excess and repeating the cycle until the internal tub be empty and floats the rest of the cycle.

[0023] In the figure 4 only it is drawn, by simplicity, a rotary washing system which is a variant of the system of figure 3, which is used if the pressure losses in this are big. In Figure 3 the rotary tube (48) has a small diameter, equal to the output of the exhaust (36), which can produce big friction losses due to the high speed of the water in the tube and its curvature. To limit these losses, keeping a big diameter in all the rotary tube (48) , in Fig. 4 the exhaust is installed on the end (40) of the tube (48), after his double curvature (46) (47), connecting such extreme (40) directly to the Venturi (39) of the exhaust.

[0024] The cylindrical closed steam chamber (57), which is fixed to be able to feed directly to the electrical resistance (56), is housed within the central post (1) and it is centrally crossed and supported by a passing wide tube (69) which is continuation of the feeding tube (8). The lower end of the wide tube (69) outstands of the core of the steam chamber (57), the enough to be articulated with the rotary tube (48) by means of a rotary coupling with the brake shoe (52) linked by the rotary plates, lower (50) and upper (51), as it was described.

[0025] The connection between the fixed steam chamber and the suction of the exhaust, which rotates with the system, consists of a thin vertical tube (68) which, with its upper end inside the chamber, sucks the generated steam and then it gets into the side of the passing tube (69), in such a way that its lower end stays concentric or coaxial with this tube, and connected to the borehole of a small vertical bushing (70) of thick wall, fixed by means of an arms (73) to the inner of the wall of the passing tube (69). Below the bushing (70) it is introduced in the borehole of this second thin and short tube (76) which can rotate inside the bushing, slightly adjusting its diameters as a pillow block. This second short tube (76) is connected, through a small flexible hose section (72), with a equal third tube (38) which goes down centrally until being placed within the rotary tube (48), wherein it is fastened by a ring (74) fixed to the inner of the rotary tube by another arms (73); then, the third tube (38) goes out from the rotary tube (48) through the wall thereof and it is directly connected with the suction (37) of the exhaust. The sealing of the connection between the fixed

portion and the rotary portion of the duct of the steam is made with a mechanical or rotary seal comprising a disc (71) or ring that has its upper surface polished and is tightly mounted around the second thin tube (76), which is pressured against the lower face, also polished, of the bushing (70), pushed by a spring (75) which at the lower is supported against the ring (74) which holds the third tube of steam conduction (38). The flexible hose section (72) serves so that the spring can push the sealing disc. In such a way, the steam sucked by the fixed tube (68) can flow by the tube (38), which turns with the exhaust, towards the suction chamber (37) of this. The disposition of the other components of the rotary washing system is equal than in Fig. 3.

[0026] As an option, the steam chamber (57) of Figures 3 and 4 can be fixed to any other place outside the central post, using a connection tube (38) or (69) with the suction of the exhaust of enough length.

[0027] The figure 5 is similar to the washing system described on Figure 4 and it shows, in addition, the tubs (7) and (14). The difference consists in that the steam chamber (57) is not static and rotates joined to the rotary tube (48). Furthermore it is showed the planetary speed reducer (2) which transmits the rotation of the rotary tube (48) to the central post (1). The feeding tube (8) also enters by the upper of the tubs and it articulates to the rotary tube (48), of equal diameter, through the already described rotary coupling which comprises a support brake shoe (52) and the rotary lower (50) and upper (51). The planetary reducer (2) is centered within the post and above of the rotary coupling between the tubes. The driving gear (79) of the reducer is mounted in a bushing (78), joined at the upper plate (51) and slightly adjusted slightly to the feeding tube (8). The shafts of the other gears of the reducer, which are fixed to transmit the torque forces, are mounted on a round support (80), fixed to the feeding tube (8) which also serves to support the rotation of the post (1) through a bearing system (81).

[0028] Below the rotary connection, the cylindrical steam chamber (57) is integrated to the rotary tube (48), thus, the tube centrally crosses the chamber. The rotation of the exhaust and the steam chamber (57) together with the rotary tube (48), allows the continuity between the internal tube (68) of the steam chamber and the tube (38) which feeds from this to the suction chamber (37) of the exhaust be made with out the necessity of use a rotary seal. The power supply to the resistance (56) that heats the water of the steam chamber is done indirectly, either through a sliding socket connection over the copper or brass rotary rings, as it is described below, or by means of an electric converter, whose primary is fixed and the secondary, turning with the other components, it feeds to the electrical resistance. Other form to heat the water stored in the chamber is by heat conduction through the walls thereof, placing a heater close to the outside of these walls. These heating systems are not shown in the figure.

[0029] As in the fig. 4, the curved portion, (46) and (47),

of the rotary tube (48) and the exhaust are confined within the cover (58) which in this case is separated of the central post (1). It is observed that, within the cover, the curved portion of the rotary tube (48) and its end (40), connected to the Venturi (39), increase their diameter, as far as possible, to decrease the pressure losses. The output tube (36) outstands of the plane (66) of the cover (58) directed towards the dragging zone which is formed by the end (44) of the helical plate (4) and the core surface of the tub (59). By the front of the exit of the exhaust (36) and the dragging zone, the cover (58) has welded a horizontal plate (77) curved upwards (see the cutting of the AA' section), which serves to the water jet and the dragged clothes being deviated upwards of the tub and the rotary impulse of the water mass of water around the post be broken, so that in the other spaces of the tub the streams being slow and the clothes not be so much ruffled.

The figure 6 is a mechanism which controls the paused rotation of a rotary washing system, which uses a planetary speed reducer to transmit the rotation of the rotary tube (48) to the central post (1). The figure only shows a zone of the central post (1), with the rotary tube (48), the planetary speed reducer (2) at the upper and the controlling mechanism at the bottom, with a portion of the bell-shape cover (58).

[0030] It can be seen that the mechanism firstly consists of a thick ring of rectangular section (87) or cam ring, concentric with the rotary tube (48) and fastened by a radial arms (49) to the inner wall of the central post (1). The upper surface of this annular plate (87) or cam ring is divided in any appropriate number of sections which comprise, each of them, a split portion or valley (89) followed by a slope which finishes in a top or flat crest (88), as cam path. In each section, four in this figure, a corresponding leg (86) with a rounded and slipped end that in whole supported and slipped over each of the paths, by above of a second heavy ring (85). This ring is mounted on the rotary tube (48) and lashed to this by means of a longitudinal wedge (90) fixed to the own tube, in such a way that, with light adjustments, the ring (85) can slide along the tube but not rotate respect to this. The rotation of the second ring (85) and, therefore, from the rotary tube (48) is stopped when the upper face of this ring is pressed against a stopping plate (84) adhered to a no rotary third ring (83). The third ring (83) can be a little raised to separate the stopping surfaces and to release the rotation of a second ring (85) and, consequently, the rotation of the rotary tube (48), of the exhaust (2) and the post (1). Thus, the third ring has at the upper an articulated handle to the end of a lever (91), which raises the ring to rotate in its other end over a swivel encrusted on a bar (92) which, passing through the free space of the exhaust (2), it is fixed to the support (80) of the reducer shafts; thus this disposition avoid, on the other hand, the rotation of the ring (83). To stop of release the rotation

of the tube, allowing that the third ring presses over the second or separating to these, the lever moves vertically by a valve rod (93) articulated in the middle portion of the lever and acting by springs and any mechanic system or electromagnetic of control.

[0031] By means of the reducer and this mechanism, the paused rotary cycle of the rotary tube (48), coordinated with the rotation of the post (1) and its helical plate, is carried out by the driving frequency of the valve rod (93) and by the relative rotation between the rotary tube (48) and the cam ring (87) which rotates, together with the post, slower than the tube. During this relative rotation, the second ring (85) locate its legs (86) upon the high cam paths and it is pressed against the plate (84) of the third ring (83), stopping its rotation and the one of set. The stopping lasts until that the valve rod (93) raises to the third ring a time to releases again the rotation, which, when continuing, does that the legs of the second ring fall in the low cam path, avoiding the stopping until that the mentioned rotation puts back them into stopping position and the cyclic position of the output tube of the exhaust respect to the dragging zone, must be such that allow the paused circulation of all the clothes through the tub, with out entangle so much.

[0032] The figure 7 is, basically, similar to the rotary washing system of figure 5, except that the system is below the tubs (7) and (14), connecting the feeding tube (8) to a passing hole (103) at the core center of the centrifuging casing (23)). Over the passing hole (103) is fixed vertically, as a continuation of the feeding tube (8), a short stretch of flexible hose (102) whose upper end joins a first short and rigid tube (101), staying these two loosely housed inside the draining tube (61) of the centrifuging turbine. This first rigid tube (101) is introduced certain distance within a second tube (100), joined to the core center of the internal tub (14) and which crossing this, it rises within the tub until a height a little above of the established floating level (29) prefixed of the same tub. This arrangement serves to, without interrupting the continuity of the feeding duct, the second tube (100) and the tub can rotate on the first tube (101) and, at the same time, they move with this one laterally in any direction due to the flexibility of the hose, allowing the rotation of the floating tub around any virtual shaft during the centrifuging.

[0033] A third tube or rotary tube (48), equivalent to the tube (48) of figure 5, is inserted into the second tube (100) by the upper portion of this, until that a ring-shape smooth brake shoes (99), which has each of the tubes, settled one on the other to support the weight and rotation of the third tube over the second one.

[0034] The aforementioned tubes are introduced one into the other with a fine adjustment, as a pillow block, to allow the free rotation between them and to form, together with the initial hose, the duct to feed the rotary washing system as continuation, with equal big diameter, of the feeding tube (8).

[0035] In the figure 7 it is seen the upper end of the rotary tube (48) that finishes off and debouch into a closed

chamber (97), in form of dome or of a double wall-widen bell, so that the tube (48), gradually opening its diameter, is connected with the inner peak of the bell, which centrally surrounding the tube, it enlarges and unfolds until the tub core. Over the drainage of the rotary tube (48) there is a conical appendix (98) which, with the vertex directed downwards, serves as a deflector for the flow which goes out by the nozzle of the tube (48) deviates 180 degrees towards the periphery and the bottom of the double-wall bell, where the same bottom and the two walls of the chamber (97) are extended and converge (see cutting of AA' section) in such a way that they are molded in a circular exit (107), horizontal and tangential, which is connected with the conical and gradual entry, of a horizontal, curved tube (40) of big diameter tagged to the core of the bell. As well as in Figure 5, the tube (40) is connected to the Venturi (39) of the exhaust, in such a way that this stays within the cover (58) which is a radial extension of the bell-shape chamber and only the outlet tube (36) of the exhaust outstands through a hole in a vertical and radial plane (66) in which ends the cover, directing the discharge of the water jet and steam bubbles towards the dragging zone formed by the surface (44) of the helical plate (4) and the core of the tub (14). In front of the dragging zone is fixed to the chamber (97) a curved plate upwards (77), with the same function described in Figure 5. The rotary coupling of the tube (48) with the second tube (100) and the water jet discharge, perpendicular to certain distance of the center, by the output tube (36) of the exhaust produce a pair of forces by jet reaction which makes rotating the washing system, as it was described. Due to the big section of the bell-shaped chamber (97), the losses by changing the direction of the flow within them are minimal.

[0036] In order to feed to the suction (37) of the exhaust by the steam chamber (57), rotating both with the rotary washing system, this is placed inside the central post (1) in such a way that the same connection tube (38) of the steam is used to join the core center of the steam chamber with the dome center of the bell-shape chamber (97) to make rotate that. The upper end (68) of the connection tube (38) stays within the steam chamber in order to suction this and its bottom end (104), welded to the dome, and continues its connection until the suction (37) of the exhaust.

[0037] At the upper of the steam chamber (57) is welded a shaft (105) which moves the central gear (79) of a planetary speed reducer (2), which transmits the rotation of the chamber to the central post (1). In order to transmit the pair of the impelling shaft (105) it is necessary that the shafts of the others intermediate gears (96) be fixedly supported respect to the system; but, on the other hand, all the rotary washing system must be able to move in any lateral direction according the internal tub moves while centrifuging. Over the reducer (2), is placed a round plate (80) which supports such shafts, and it is joined by above, to other upper plate (95) fixed to the structure (94) of the washing machine by a flexible tube (106) which

supports the twist, in order to allow, with out rotating, the lateral displacement of the support plate together with the rotating system. In addition, the plate (80) registers the rotating of the upper end of the impelling shaft (105) in a central bushing and, at its periphery, the rotation of the central post (1). The power supply which in this figure appears within the flexible tube (106), to the resistance (56) of the steam chamber is detailed in Figure 8.

[0038] The figure 8 is an amplification of the upper portion of the central post (1) of figure 7 and shows two variants more of the system which allows the lateral displacement of the support of the shafts of the speed reducer (2). As in the previous figure, these variants have a round plate (80) which supports the shafts of the gears (96) of the reducer and also it registers the rotation of the impelling shaft (105) and of the central post (1).

[0039] Before continuing, it is taken advantage of Figure 8 to describe the power supply to the resistance (56) of the steam chamber (57) (Fig. 7). The support plate (80) extends upward in a box (108) within which are mounted two rings of copper or brass (109), electrically isolated at the end of the driving shaft (105) joined to the steam chamber. Each ring (109) is connected to a terminal of the electrical resistance (56) by wires, sealed within an axial hole (not illustrated) in the same driving shaft (105) until the resistance (see Fig. 7). The electrical energy is fed by brushes (110) which slide on the rings (109) during the rotation.

[0040] Over the box (108) of the support (80) of the shafts, it is centrally fixed a horizontal bushing (111) inside the one that freely slides a round bar (114), in whose ends are welded, perpendicularly to them and centered, other round bars (112). Each of these two bars freely moves in their turn within set bushings (113), one on each side of the bar, which are joined to a plate (95), fixed to the structure or lid (94) of the washing machine. In summary, the mechanism consists of fixing the box (108) of the support (80) to a first runner, which allows to move it along a shaft, and this first runner is fixed to another similar runner which moves in perpendicular sense to the first one, therefore the device, combining both perpendicular displacements, allows to the support moves in any lateral sense, but not rotate.

[0041] At the right bottom of Figure 8 shows one third variant of the system that holds the supported plate (80) so that this can move laterally, combining a linear movement with another angular. Over the support box (108), a horizontal round bar (114) is introduced within a bushing (111) that can slide freely through the bar and articulated rotate to a vertical bolt (118) fixed at center of the box; furthermore, an end of the bar can rotate on another bushing (116) articulated to another vertical bolt (115) fixed to the structure (94) of the washing machine. To avoid the tendency to rotate of the plate (80) and its box (108), are placed speed bumps (117) on the box (108), so that when beginning to rotate the plate these speed bumps block the rotation with the bar side (114).

- **The Figure 9** is a washing machine equal than Fig. 7, except that the steam chamber (57) is fixed and can be placed outside the rotary washing system which remains centered with the geometric shaft of the washing machine, without moving with the internal tub (14) during the centrifuging cycle.

[0042] As in the figure 7, the feeding tube (8) is connected to the central passing hole (103) of the core of the centrifuging casing (23) and on this hole it is fixed directly, onto a brake shoe or base ring (120) of smooth surface, a first short tube (101) as continuation of the feeding tube (8). In this case, the short tube (101) is introduced, with pillow block fine adjustment within the third rotary tube (48) described in figure 7, in such a way that this can freely rotate over that supporting its brake shoe or bottom smooth ring (99) over the base ring (120), to support the rotation and the vertical boost of the washing system. As passageway so that the rotary tube (48) comes in the internal tub (14) and ends within this in the bell-shape chamber (97), a second tube (100) raises in the core center of the internal tub to a height greater than the flotation level (29), to avoid the entrance of the water to the tub during the same flotation. The second tube (100), opposite to the same tube of Fig. 7, does not fit to the other tubes and it must be of such diameter that it keeps enough clearance between it and the rotary tube (48) and equal clearance with the inner wall (119) of the bell-shape chamber (97), so that the tub (14) and the same second tube (100) can laterally move during the centrifuging, with out collide with the chamber or with the rotary tube.

[0043] The conduction of the steam from the fixed steam chamber (57) to the suction chamber (37) of the exhaust is made firstly by means of a thin tube (68), which connects the upper zone of the steam chamber with the inner of a closed box (108) within the central post (1). This box serves for the passing of the steam to a second vertical thin tube (38), whose upper end comes in, with smooth adjustment, into a centered bushing at the box core. Since, having its bottom end welded to the dome centre of the bell-shaped chamber (97); the tube (38) must rotate over the bushing, at the entrance of the tube (38) a rotary seal is placed, to avoid leaks. The connection of the steam is completed through another thin tube or hose connected between the lower end (104) of the second thin tube and the suction chamber (37) of the exhaust. In the second tube (38) is mounted the input gear (79) of the planetary reducer (2) and the support (80) of the shafts thereof, integrated to the passing box (108), it is fixed to the lid (94) or the machine structure. In such a way the thin tube (38), in addition to drive the steam to the suction of the exhaust, it serves as impelling shaft of the speed reducer and as shaft which support the upper of the rotary washing system, which rotates centered and does not require of the mechanisms described in Fig.8.

[0044] The figure 9 also shows another system to fit

the flotation level (29) of the tub before the centrifuging. The system consists of a closed container (126) which has a volume equal than the water volume which is between the two tubs and the flotation level (29), excluding the free volume within the centrifuging casing (23). Below the closed container (126) there is a small draining pump (62) which connects its input or suction (122) to the core of the main tub (7) through a valve (121) and its output or discharge (124) to the core of the closed container (126) through another valve (125). Additionally to this first connection, it is added another pair of tubes with their control valves (123) which connect the suction and the discharge of the pump, by exchanging the initial connection between these with the tub and the closed container, respectively. At the top, the container (126) has a tube (64), with its control valve (127), which connects it to the output (65) of the main tub (7) on the flotation level (29); moreover also having a waste-pipe (63) to drain it to a high level.

[0045] After the washing or rinsing cycles and keeping closed the valves (123) the draining pump (62) is started with the valves of the first connection, (121) and (125) opened in order to evacuate the water of the tubs until the level of the core of the main tub (7), transferring it to the closed container (126); in such a way that the excess of water which passes over the volume of the container is evacuated by the waste-pipe (63) to the general drainage and only remains, therefore, in the container (126) the necessary volume to fill again the space between the tubs at the flotation level. When the level of the extracted water becomes below of the core of the internal tub (14), the retainer valves (27) of the core of this open and allow the exit of the remaining water thereof. After emptying the tubs, the valves (121) and (125) of the initial connection are closed and are opened the two valves (123) of the second connection, so that the water flow is inverted between the container and the tub, in such a way that all the water stored in the container (126) is retaken to the main tub, so that the water level between the tubs reaches the prefixed flotation level. When the water, which is returning to the main tub (7), comes to the core level of the internal tub (14) the retainer valves of this one are close and avoid that the entrance of water to the inner thereof, thus, this tub stays floating to start the centrifuging. With the opened valve (127), the excess of water from the squeezed clothes, which comes out of the internal tub, is drained by output tube (64) at the side of the main tub towards the closed container (126), keeping the flotation level (29).

[0046] Fig. 10 is amplification, for better clarity, just of the bottom of the tub (7) and the tub (14) with their central tube (100) and the balancing chamber (28), of Figs. 7 or 9. This chamber, at the side of the internal tube as variant of the chamber of Figure 1, not only includes the first annular portion (28) of the side of the internal tub, but also it continues in a second portion or cylindrical cavity (129) below of the basis of this tub, in such a way of double core crossing by the central tube (100). The an-

nular portion (28) of the chamber is divided by vertical plates (128) in opened cells set communicated below with the second portion of the chamber (129). These vertical cells are of two types, both alternately distributed from the side of the tub.

[0047] Each cell (133) of the first type is divided in two portions by means of a horizontal plate (130). The upper portion is separated of the rest of the chamber by the plate, forming a compartment (131) which has a series of holes (10) in its inner wall and another series of holes (132) by above of the flotation level (29), in order to not affect this one in its outer wall; thus, the first type of cells serves to evacuate from the internal tub (14) the recirculating water flow. The bottom of these first cells (133) has the same function as the second type of cells. Within the compartments (131) can be placed filters.

[0048] The cells of the second type (134) lack of holes and they are directly communicated to the double core of the tub (129), which stores, when the tub is not rotating, the fluid and heavy material which serve as counterweight to balance. If the clothes are not distributed when the tube is rotating the virtual rotary shaft, which passes through the center of gravity, it will move at certain distance of the geometrical shaft of the tub towards the overweight is, in such a way that the cells diametrically opposed to the counterweight keep with a greater rotation radio that the cells closed to the overweight, provoking the tendency by the centrifuging force, that the counterweight flow enters in greater amount into the opposed cells than the closed to the overweight.. To increase the balance of the tub by this distribution of the flow and however that, for the same reason, the virtual shaft moves to coincide with the geometrical shaft, the flow trapped in each of the second cells (134) could not be redistributed in the whole annular chamber as in Figure 1, since the separating plates (128) of the plates impede it to do it, which allows to continue keeping the initial balance.

- **The figure 11** only shows only the core area of the main tub (7) and internal tub (14) of Figure 10, making greater vertical scale than the horizontal, in order to describe more clearly a mechanism which is added to the balancing chamber of Figure 10 to improve the performance of this. This mechanism is housed at the second horizontal cylindrical portion (129), centrally crossed by the tube (100) of the chamber (28) and it works obstructing the passing of the balancing fluid towards the cell of the second type (134) from the overweight side by compensating and allows this passing towards the cells of the opposite side. Inside the cylindrical cavity (129) of the balancing chamber, there is a horizontal bar (135) with a ring (138) at its center slightly adjusted to the diameter of the support tube (100) which serves as shaft so that the bar rotates respect to the geometrical center of the tub. At a side of the bar (135) is mounted a small counterweight (136) which can slide over the bar and whose sliding towards the end of this one is

limited by a spring (137), which works to compression with little force. Near the entrance of the cells, the other end of the bar is joined to the center of a light and vertical plate (139), which has a width, a curvature and a length such that obstructs the passing of the fluid towards some cells.

[0049] If the weight of the clothes is asymmetrically distributed when the tub starts to rotate, the geometrical shaft of the tub or the passing tube (100) and, therefore, the bar (135) together with its central ring (138) will rotate around the virtual rotary shaft which is displaced to certain distance from the geometrical shaft; by the above, the centrifugal force applied to the counterweight (136) will cause that the bar rotated on its ring (138) until that the counterweight (136) until the counterweight stays diametrically opposed to the virtual shaft or to the clothes counterweight, compressing the spring (137) to go over the end of the bar. In this position the obstruction plate (139) covers the entrance of the balancing fluid to the cells of the second type (134) of the side where the over-weight is, until the fluid which goes into the opposite cells compensates the weight undistributed. As the weight is balanced within the tub, the virtual rotary shaft approaches to the geometrical shaft and the centrifugal force on the counterweight (136) is annulled to coincide both shafts; at the same time, the counterweight (136) stops to compress the spring (137) and it is passed, pushed by this, towards the center to its initial position; this movements provokes, by the conservation of the annular moment, that the counterweight (136) the bar (135) and the obstruction plate (139) tend to increase their rotary speed rotating faster than the tub, so that the position, with respect to the cells, of the bar (135) and the plate (139) is indifferent and the rest of the balancing fluid is uniformly distributed in them.

[0050] The Fig. 12 is a mechanism which supports to the internal tub during the centrifuging, coincide or not its virtual rotary shaft of rotation with its geometric shaft. It is considered the speed of any point of the tub is equal to the speed of the point respect to the geometrical shaft of the tub plus the speed of this shaft respect to the virtual shaft.

[0051] In this figure only is showed the core of the tubs, main (7) and inner (14), and the new mechanism which supports to the internal tub. The first portion of the mechanism consisting of a platform (146), centered under the internal tub (14), which has a central hole which is loosely cross over, by a guiding tube (145) which is centrally joined to the core of the tub. The rotation and the weight of the internal tub are supported by a circular tier or series, concentric with the tub, of vertical wheels (143) with shafts fixed to the platform and directed in a radial form to the center of the tub. Other series of horizontal wheels (144), with their vertical shafts also fixed to the platform, are distributed around the periphery of the platform hole, in such a way that the wheels, supporting their rotation on the surface of the guiding tubes (145), keep and guide

the concentric rotation of the internal tub (14) respect to its geometrical shaft and to the platform (146). The speed of any point of the tub due to this rotation, concentric to the geometric shaft of the tub, constitutes the first component of the absolute speed of the same point.

[0052] The second portion of the mechanism allows that the platform moves freely in any lateral direction; for this a series of supports is placed under the platform to sustain it. Each support consists of a horizontal bushing (147) with a round bar (141) of certain length within it, over which the bushing slides freely as slide valve; the bushing can transversely rotate to its geometric shaft on a vertical pivot (148) fixed to the platform below this one, at the same time that the bar (141) can move horizontally and angularly, rotating over one of its ends welded to another bushing articulated to a vertical pivot (142) anchored this on a round protuberance which outstands from the core of the main tub (7). So that each of the bars (141) did not support in cantilever the weight of the tub which transmits to it its sliding bushing (147), at the other end of each bar, opposed to the rotation, it is mounted a vertical wheel (140) with its collinear shaft to the bar and from such diameter which rolls tracing a circle supported over the core of the main tub (7), when the bar moves angularly. The combination of the linear movement of the sliding bushing (147) on the bar (141) and the angular displacement of these over one of their ends, it gives freedom to the platform (146) to displace in its horizontal plane in any lateral direction, without rotating in any lateral direction, in similar for to the described system at the bottom of Fig. 8.

[0053] Another form to support the lateral displacement of the platform (146) consists holding this to a first sliding system which moves in certain horizontal direction, being this first system fastened in its turn to a second sliding system fixed to the main tub, which moves also horizontally, in a perpendicular direction to the first system, in similar form to the system illustrated at the upper of Fig. 8.

[0054] The second portion of the mechanism described in the last two paragraphs, in any of its two versions, allows that the platform (146) supporting to the internal tub, and carried or driven by this same, moves horizontally, tracing a circle equal than the circle that trace the geometrical shaft of the tub around any virtual shaft on which rotates the tub. This movement of the platform provides to any point of the tub the second component of the total speed, with which such point moves respect to the virtual shaft over which the tub rotate.

[0055] The figure 13 is the same washing machine than in Fig. 7, except that the mechanism of Figure 12 is added to support the rotation of the internal tub (14). In addition, are used two centrifugal pumps coupled to the same submersible motor (150), which are within the centrifuging chamber (23) supported by a plate (152) which hangs from the platform (146) of the same supporting mechanism from Figure 12.

[0056] One of the pumps (149) directly feeds the jets

of the nozzles (17) which impel the special turbine Pelton, whose box (25) is joined to the guiding tube (145) from the core of the tub. The feeding tube (8) connected without a valve to the discharge of another pump (18) is inserted directly, with smooth adjustment into the passing tube (100) of the tub over which rotates the tube (48) of the same rotary washing system from Figure 7. The suction (19) of both pumps stay directly submerged within the centrifuging chamber (23), where continuously recirculate the water to establish the two closed pumping circuits. The two centrifugal pumps operate with different rotary direction, with the purpose to operate either the rotary washing or centrifuging system; it is enough to change the rotary direction of the engine or motor in its feeding wires (151), sealed and flexible, activating the performance of a system and deactivating from another one, without the need of use control valves. The engine or motor with two pumps of opposite rotation can be used in the other cases described here.

[0057] The Figure 14 is a device for disintegrating the threads that the clothes loosed and to avoid that they obstruct the performance of the pump (18). The device is mounted within a large diameter tube (159), interposed in the suction tube (19) through a conical tube (155). The device consists of a rotating blade (157) of several sheets, mounted transversely in an extension (156) of the driving shaft of the pump, cutting the threads which the water carries against other fixed blade (153), also of several sheets by adjusting the pressure between them with the spring (158) at the end of the shaft. Rotating blades (157) also pressed against a plaque (154) below with multiple perforations that retain some threads to be crushed by the blades against the same plate.

[0058] The Figure 15 shows a washing machine of two horizontal tubs and front-loading, similar to the common of this type, in which are applied the new concepts described in the previous figures. As in those figures, the washing machine has a main tub (7) which in this case, is a drum placed horizontally, with a circular, chamfer or conical opening (161) on its front face and within which is placed, centrally, another rotary horizontal drum or internal drum (14). This last drum has multiple perforations (10) and a series of parallel blades (5) internal welded along its side, furthermore a circular opening (168) chamfered on its front face, to introduce the clothing. To contain the water inside the drums, the front opening (161) of the main drum (7) is closed hermetically by a conical periphery cover lid (162) with a sealed wrapping

[0059] During the washing or centrifuging, the internal drum (14) should be adapted to rotate within the main drum (7); for this, the main drum (7) has, in the back side and housed towards its inner, a first wide and short tube (174) joined by its back end to the core center of the drum, with free passing to the inner of this one; in such a way that this first wide tube remains, with a smooth adjustment, into a second wide tube (175) with its inner end externally joined, to the core center of the inner drum (14); thus the rotation of the internal drum (14) is sup-

ported on the rotation of the second wide tube (175), as a pillow block, over the first wide tube (174), as a support shaft.

[0060] On the other hand, the rotation of the inner drum (14) at its front end is supported on a wheel (167), with conical periphery, which fits in the round opening (168) chamfered from the drum and rotates with this. The shaft (163) of the hub (165) of this wheel (167) rotates supported by a bearing box (164) sealed and joined to the center of the lid (162) of the main drum (7), so that this lid (162), pulls with oneself to the supporting wheel (167) to close or to open, for putting or to removing the clothes. To have an adjustment pressure of the linkage between the wheel (167) and the internal drum (14), the wheel hub (165) internally has a compression spring (166) which supported at the inner end of the shaft (163) pushes to the cube so that the wheel be pressed over the opening of the drum.

[0061] Also in Fig. 15 the washing machine works with a pumping closed-circuit which feeds of power to the washing or centrifuging connecting the pump discharge (18) to each of these two systems and their suction (19) to the bottom side of the main drum (7). Due to during the centrifuging, as it will be seen in the figure below, the drums move together with their connection pipes to the pump (18), in these pipes are interposed some hoses (102) with enough flexibility to absorb such movements.

[0062] The washing is made, as in prior cases, by a special fixed exhaust fed by a tube (8), with control valve (13), connected to the discharge of the pump (18) and with the suction of the exhaust connected to a chamber (57) steam generator, also fixed. The back and central connector, from the water flow for the washing is made using a conical intermediate amplification (172), with a deflector nucleus (173) also conical in its center, to connect the feeding tube (8) with the back end of the first wide tube (174) of the mean drum, in such a way that this tube introduces the flow inside the inner drum, passing through the wide tube (175) of this. The wide feeding tube (174) is connected and ends centrally, within the inner drum, on the basis of a cylindrical horizontal box (97) which serves to direct the flow towards the input of the exhaust; in such a way that the big area of the section from these two components decreases the speed of the flow, and thus, the friction losses by the changes in its direction. So that the water flow acquires a rotary impulse to enter in the cylindrical box (97), it is placed within the first wide tube (174), along to this and until the core of the cylindrical box, a duct or helical plate (160) which gives this movement to the flow. The flow which is entering to the cylindrical box with such movement is directed, through a volute (176) within the box, towards an output tangential tube (40) in the box periphery. The output tube (40) ends in the Venturi (39) of the exhaust, which directs its exit downwards and the most tangentially possible over the blades (5) from the bottom sides of the drum, in such a way that the water jet and the bubbles, colliding against the blades, impulse the rotation of the inner drum

to cheat with the same blades to the clothes, in the sine from which cavitate the bubbles. The connection between the steam chamber (57) and the suction chamber (37) of the exhaust is made by a thin tube (38) which enters, by the wall of the first wide tube (174), towards the cylindrical box and the exhaust within this.

[0063] In order to make the wringing by centrifuging, in the second wide tube (175) is mounted a common Pelton turbine (170), which is impelled by water jets which collides over the buckets (24) and they are launched by nozzles (17), with control valve (16), connected to the discharge of the pump (18) therefore, thus, the turbine drag in its rotation to the inner drum holding back the wet clothes for wringing. In the prior face of the buckets is perforated a small hole (169) in which finish a radial thin duct (171) which is until the inner surface of the second wide tube (175), with the purpose that the rotation of this tube be lubricated with a small portion of the same water which launch the nozzles over the buckets.

- **The Fig. 16** is a variant very similar to the horizontal washing machine of the Figure 15 and, as in this figure; the connector of the feeding is the central back part of the mean drum (7). This case the feeding tube (8) is directly connected with the Venturi (39), in such a way that this, the output tube of reduced diameter (36) and the suction chamber (37), fed by the fixed steam chamber (57) through the tube (38), which compose the special exhaust, are housed securely within the wide tube (174) joined to the center of the mean tube (7) and which serves as shaft of the inner drum (14) and it curves downwards and the steam bubbles towards the bottom side of the drum. The end of the output tube (36) is covered with a disc (58) close to the core of the inner drum and of rounded surface to avoid that the clothes be hooked with such end.

[0064] In this case, the closed pumping circuits for the washing and for the wringing are separated, so that the hydraulic circuit which feeds the exhaust is fed by a centrifuge pump (18) which works with a rotary sense contrary to the centrifuge pump (149) of the wringing circuit by centrifuging, both being impelled by a same motor with the interchanging rotation to activate one or another pump. This double pumping circuit has the purpose of to alternately turn each circuit, in such a way that to operate the wringing pump (149), this launch a water jet, through of its tube and the discharge nozzle (17), over the buckets (24) of the Pelton turbine (170) joined to the inner drum to rotate this a little bit and to make the shoveled of the clothes by means of the inner blades (5) of the drum. Then the rotation of the motor is changed to turn the pump (18) function which feeds and activates the washing action of the exhaust, repeating adequately of the two cycles slowly.

- The figure 17 shows the system which allows to the

inner drum (14) of the Figure 15 or 16 rotate, during the centrifuging, over the virtual shaft which passes by its center of gravity. This system is similar to the described on Figure 12 and is based also in a support, equivalent to the support (146) of this Figure, which support to the tub or inner drum (14) rotating over its own geometrical shaft, while the support and the drum move laterally around the virtual rotation shaft. In this case, the same mean drum (7) has the function of the mentioned support since the inner drum rotates centrally inside the mean drum. The system which holds the mean drum and allows it to move laterally, in any direction, consists of 4 ears (177) welded symmetrically to the sides of the man drum (7) in four points, two in front and two at the back. En each ear is articulated, by a horizontal pivot (148), a vertical bushing (147) which can rotate transversally to its geometrical shaft over such pivot. Within the bushing it moves, in a runner form, a vertical rounded bar (141) whose upper end articulates a pivot (142) which allows to the bar oscillate in angular form, as pendulum, over such end in a perpendicular plane to the shaft of the drums. In the bottom end of each bar (141) is fixed a spring (178) which supports the weight of the drums supporting the bushings (147) over the upper ends of the springs.

[0065] To avoid that the forces of the vertical movement of all the prior supports system of the drums be transmitted to the structure (94) of the washing machine in vibration form, this system in its turn is fastened to another system which consist on fixing respectively the two pivots (142) of the fore oscillating bars (141), and equally in the two pivots of the rear end, to each one of the ends of an horizontal bar (179) in whose middle part is raised a vertical shoot (1839 are articulated, in rotary form, an end of each of the other bars (184) which are opposite, each one towards a side of the shoot, and sloping downwards with certain angle, as normal position. The other end of each of these two bars, also sloping, is articulated in same rotary form, to a corresponding second horizontal rounded pushing bar (182) which runs within a bushing (180) fixed to the structure (94) of the washing machine. The driving in opposite sense of these last two horizontal pushing bars (182) is limited by springs (181). Thus, the motion vertical force upwards and downwards of the horizontal bar (179) is projected by the two sloping bars (184) in two horizontal forces and opposite over the bars (182) and the pushing springs (181) to both sides of the shoot; moreover of the little vertical projection of this force just produces pairs o torsion efforts contrary in each fixed bushing (180), in such a way that the forces over the two springs and the torsion pairs over the two opposite bushings to those from the other side, therefore, the reactions over the structure of the washing machine are equal and opposite, therefore, the vertical motion force is transformed in inner efforts over the structure, annulling as vibration producers.

[0066] To decrease the movement of the virtual shaft of rotation respect to the geometrical shaft of the drum, as in Figure 1, annular balancing chambers (28) are placed, surrounding each end of the inner drum (14).

[0067] The Figure 18 is a variable of the Figure 12 to avoid the vibration in the centrifuging, similar to the system on Figure 17, but applied to a vertical washing machine, in such a way that the mean tub can be move laterally to be supported by a special supports system, while the internal tub rotates over its geometrical shaft within the mean. The washing system is the same of Figure 7, except that the feeding tube (8) of the exhaust enters directly into the mean tub (7) fixed to this and adjusted to the inner of the central passing tube (100) of the internal tub (14), in such a way that, furthermore, the tube can rotate over its same passing tube (100) coupled to the Pelton-type turbine (25) and registering its rotation in a bushing (185) that the mean tub (7) has in its center. Although it is not required, is convenient that the tub floats so that the weight thereof over the bushing is less.

[0068] The mechanism which during the centrifuging allows to the mean tub to move in any lateral direction in a series of supports which support to the tub below and around this, similar to the wheels which aligns automatically in the direction of the displacement towards any side. In this case each support comprises a flat horizontal bar (147) which in one of its ends is articulated a bearing of vertical shaft or pivot (148) fixed to the core of the tub, which allows that the bar oscillates in a horizontal plane over such end. The flat bar, following the movement of the tub, moves lineally in any of both senses supported over the upper periphery of a vertical wheel (186) whose mounting (141) can rotate horizontally over other bearing of vertical shaft (142), so that the wheel can align in any moment with the direction of the bar. Below of the box which support to this last bearing (142) is welded a guide vertical bar (188) which runs within a support bushing (187) fixed to the structure (94) of the washing machine. Between the bearing box (142) and this supporting bushing (187) is placed a spring (178) which works to compression, as a shock absorber to support the weight of the set in its displacement around of the virtual rotating shaft, the flat bar (174) must be of the enough length to allow the desirable displacement of the mean tub (7) and so that the vertical wheel (186) always keeps a minimal horizontal distance respect to the pivot or bearing (148) of the bar, with the purpose of that exist a pair which induces the aligning of the bar with the direction of the displacement of the tub in each moment.

[0069] On the other hand, the connection pipes, (8) (17) and (19), between the tubs and the pumps (18) (149), have, as in Figure 17, intercalated a stretches of flexible hoses (102) to allow the lateral movement of the connector tubes together with the mean tub (7) respect to the pumps.

[0070] The Figure 19 is a variant of the supports in Figure 18, therefore, also this new supporting system (189) of the mean tub (7) serves so that this can displace

laterally in any direction, while the internal tub (14) rotates over the shaft (194), which registers its rotation in the central bushing (185) of the mean tub and it is impelled by the afore described turbine system (25).

[0071] The new system consists in a supporting series (189) which support to the mean tub (7) distributed around its upper periphery. Basically each support consists in a horizontal crosshead of two bars or shaft (191) joined in its center to 90°, in such a way that one of the shafts rotates in its ends over the lateral of an upper inverted u-shape plate (190) welded to the upper portion (187) of the structure of the washing machine through the fixed bar (193). The other crossed shaft rotates also over the lateral of the other bottom inverted U-shape plate (192) from which hangs the upper end of a second bar (141) which passes comfortably through a horizontal hole practiced in a ear or plate (177) welded to the side of the mean tub (7), so that a spring to compression (178), fixed to the bottom end of the bar, supported below of the hole of the ear to this and to the weight of the tub. Thus, the combination of the free oscillation or angular rotation in a plane, over one of the shafts of the crosshead (191), of the bottom "U" plate (192) together with the bar (141) and the oscillation or angular rotation of these over other shaft of the crosshead, in the other perpendicular plane to the first one, allows that the bar (141) can oscillate angularly in any direction respect to the supporting bar (193) of the crosshead, supporting to the tub in any lateral displacement limited of this. This system is similar, with a different use, to a universal transmission meeting of rotation between two shafts no aligned as are the bars (14) and (193).

[0072] A variant which is not showed in the figure consists in welding the upper end of the bar (141) which supports to the tub, to a settled sphere over a spherical surface of the structure (187), as a toggle joint articulation which allows it to oscillate in any direction where the tube displaces.

[0073] The Figure 20 is a vertical washing machine, as in Figure 3, the exhaust and its steam chamber (57) are fixed within the central post, and the input of the feeding tube (8) is by the upper portion of the post. Furthermore, the supporting system (189) of the mean tub of the Figure 19, is used, so that the internal tub (14) can be centered within to that rotating over its geometrical shaft (194) within a central bushing (185); thanks to this and to the stretches of flexible hose (102), the connectors of the pipes (8), (17) and (19) can be fixed to the mean tub, in such a way that the washing machine can use the rotary washing system describe as follows.

[0074] In Figure 20, the feeding tube (8), fixed to the mean tub (7), penetrates deeply by above within of the central post (1), fixed in its turn to the feeding tube, wherein it is connected with the Venturi (39) of the exhaust, so that the output tube (36) of this, stays as near as possible to the core of the internal tub (14). Through a rotary coupling, with its supporting brake shoe (52) and rotary plate (50) as it was described, the output tube (36) of the ex-

haust is articulated with a rotary tube (48) which is short, of the same diameter and this is folded a few grades respect to the vertical. The possibility that the rotary tube (48) be the shortest possible and that its folding be small, allows to have losses by minimal friction on this, in comparison to the same tube of the Figure 3. The suction of the exhaust is fed directly, through the tube (38), by the steam chamber (57) and the electrical resistance within this is equally fed directly.

[0075] The central post (1) fixed has two helical plates (4) separated 180° one from the another one and, in the other hand, the core (45) of the internal tub (14) is rounded from the center to the periphery, as a middle toroid curve, in such a way that the core center raises a conical elevation (197) close to the end of the rotary tube (48); in such a way that, dragging areas are formed between the surface (44) of the endings of the helical plates (4) and the curved surface (45) of the core of the internal tub (14). The output of the tube (48) stays tangential to the curvature of the peak of the elevation (197) and placed between this curvature and a small conical deflector (196) fastened around of the bottom end of the central post (1). Thus, the water jet and the bubbles discharged by the rotary tube (48) drag the clothes which are in such dragging areas, directing towards the periphery of the tub wherein the current and the clothes, guided by the curvature of the tub core, raise by the side of the tubs until the upper portion of these, to later retake towards the core by the center of the same tubs guided by the helical plates (4) again towards the dragging areas, to be impelled repeatedly by the jet which gets out of the exhaust.

[0076] The system consists firstly of a small motor (199), of slow speed, mounted vertically over a plate (198) within the central post (1). The shaft of this motor is coupled through a small pinion engage (200) with the periphery in form of engage of the plate (50) of the rotary coupling of the tubes, in such a way that the plate also functions as engage impels to make rotating the rotary tube.

[0077] The Figure 21 is equal than Figure 20, except that the connector of the feeding tube is made by the bottom part of the tubs. The feeding tub (8) is introduced below of the central part of the box (37) and the output tube (36) of the special exhaust; they stay housed within a tube (100) whose upper end is welded to the core center of the internal tub (14), furthermore to be joined to the turbine Pelton (25). This tube (100), furthermore to be the passing duct of the exhaust to the internal tub, also serves as the rotation shaft of this and from the turbine over the central bushing (185) of the mean tub, therefore its external diameter is adjusted to such bushing. In reason that the exhaust is fixed, the chamber which generates steam (57) also is fixed and it feed of steam to the exhaust directly by the tube (38).

[0078] To discharge the jet of the exhaust within the internal tub, the rotary tube (48) is coupled, as it was described above, to the output tube (36) of the exhaust,

in such a way that the end of the rotary tube outstands a little of the core of the internal tub by the passing tub and it is curved the necessary to discharge radially the jet towards the periphery of the tub, thus, the jet impels the clothes which is in the dragging zone, comprised between the core (45) of the tub and the helical plate (44), towards the periphery and upwards of the tub. The length and the curved finish of the rotary tube (48) as small as possible to decrease the pressure losses thereof, therefore it is convenient that the exhaust enters within the shaft or passing tube (100), the most as high as possible.

[0079] The rotary washing system is complete making to rotate in small pauses to the internal tub (14) together with the central post (1) and its helical plates (4), impelled by the turbine Pelton; for this, the bottom end of the post is joined to the core of the tub through a thin legs (202) in order to allow the passing of the jet which launches the rotary tube (48). Within the central post (1) is a cylindrical box (80), fastened centrally to the structure (94) of the mean tub (7), wherein is housed a motor with speed reducer (199) which, by its centered shaft (201) joined to the rotary tube (48), makes rotating slowly to this so that the jet which discharges radially goes running all the periphery of the tub. In such a way, during the washing cycle, can be alternated the performing of the washing pump (18) with that from the centrifuging pump (149) so that this activates the rotation of the Pelton turbine intermittently, in such a way that the slow rotation of the helical plates combine with the rotation of the rotary tube (48) to facilitate the circulation of the clothes.

[0080] The bottom of the Figure 21 shows with the number (195) the same zone marked with the pointed circle in the above figure, to show that can be added, as in Figure 5 and 7, a planetary reducer (2) between the central post (1) and the shaft (201) which move to the rotary tube, so that the post transmits its rotation to the rotary tube, without the necessity of use a motor with the reducer (199) to make rotating the tube.

[0081] It is evident that the method of Figure 21 to make rotating the central post together with the internal tub, joined centrally to the core of this through two or three legs, can be applied equally to the system of Figure 20, also activating the centrifuging circuit alternately and in short pauses during the washing cycle.

[0082] The figure 22 represents an industrial washing machine for big quantities of clothes, which uses the recirculating pump principle and the discharge produced by a special exhaust (as the described in Figure 2), the steam bubbles to low pressure which implode on the water and clothes sine, as it was described in above figures.

[0083] In this Figure 22 is observed that the washing tub (7) of this new industrial washing machine consists in a waterway as a closed rectangular path, of enough length and with both ends rounded to make easy the transit of the water and the clothes through these. A special exhausts series as those in Figure 2 comprised each by a Ventury (39), a discharge tube (36) without diffuser and a steam suction chamber (37) fed by the tube (38)

from a steam generator or closed container (57) with heated water by a heater (56), they discharge water jets and steam bubbles to low pressure within the waterway. These exhausts are placed in such manner that along the waterway which impelled the water and the clothes within the waterway in a closed path around this, allowing the cleaning action of the cavitation of the bubbles over the clothes.

[0084] Each venture of the special exhaust series (19) is fed by the discharge tube (8) of a pumping system in closed circuit whose suction tube (19) of the pump (18) is connected to the waterway core through a filter (203). Along the inner sides of the waterway is placed a sloping-blades series (204) so that this provoke the shoveled of the clothes in order to be changing the relative position of this within the tub.

[0085] The Figure 23, as continuation of Figure 22, is the wringing system by rollers and rinsing of the washed clothes in the washing machine of Figure 22. This system consists firstly in a perforated carrier band (207) placed above the straight portion of the waterway which form the washing tub (7); such band is formed by two stretches o portions, so that the structure (205) between the two guide rollers (206) from the initial stretch of the band can be knocked down angularly rotating downwards and the other portion stays horizontal by above of the tub. Finishing the washing In the tub (7) from Figure 21, the structure (205) of the initial portion of the band, rotating angularly, is introduced slow and gradually in sloping form within the tub (7) until the core, while the water continues rotating an the clothes thereof. The perforations of the carrier band (207) allow that the water continues circulating while the band retains the clothes and raises them to the final stretch and horizontal of the band which carries until its end where it launches them over the other bottom band (208) which take them to introduce between the same band, supported over the guide roller (210), and other wringing roller (209) pressured over the band, to wring the clothes by pressure. The wringed clothes between the band (208) or the roller (210) and the roller (210) is poured within the other tub (211), similar to that of washing, in which is rinsed the clothes by the re-circulating pumping of the water which comprises the pump (18), the suction (19) and the discharge (8) with the nozzle (36).

[0086] The Figure 24 is other version on the industrial washing machine which uses the same washing and centrifuging systems above described to make its work. The mean tub (7) is formed by a closed waterway in circle of enough size, in such a way that the inner wall of the waterway forms a great diameter central cylinder (219) for the easy circulation of the clothes around thereof. The internal tub (14), as in the above figures, serves to centrifuging the clothes, has equal form than the mean (7) and it is housed within this with certain separation between them. For the centrifuging cycle, at the upper of the cylindrical body (219) is fixed centrally a vertical motor (218) whose shaft, directed upwards, transmits its rota-

tion to the internal tub (14) by a coupling (215) which fasts, by an arms (216), to the upper portion of the inner wall of the internal tub. On the other hand, the mean tub (7) is supported, around its upper periphery, by a supports series (189) equal to those from Figure 19, which allow it to displace in any lateral direction, while the internal tub rotates, over its geometrical shaft, impelled by the vertical motor (218), as it was described. To allow the free displacement of the internal tub (7) respect to the pipes from the pumping system, the pipes connected to the tub have intercalated stretches of flexible hoses (102) as it was indicated in Figures 17 and 18.

[0087] The washing by means of cavitation is produced, as it was mentioned, by means of a special exhausts series whose suction is connected (38) to a steam generator (57), in order to be fed by a re-circulating pumping system of the water into the tub, connecting the discharge (8) of pump (18) to the special exhaust and the suction of this (19) to the filter (203) in the core of the mean tub (7). The exhausts point their discharge jets (36) within the tubs in adequate direction and from the upper of these. The feeding tubes of the exhaust have a flexible portion (217) in order to can change the direction of the exhaust jet during the washing and in order to remove the exhaust before removing the small basket described in the following paragraph.

[0088] Inside the internal tub is a small basket (212) with the same profile or shape of the internal tub, except that it does not have the outer wall and it is fastened by a hollow and central conical body (213), which in dismountable form and of easy registration is coupled an equal conical prolongation from the coupling. The upper portion of the conical body (213) has an eyebolt (214) which serves to pull up with a crane the small basket and to remove the washed clothes.

[0089] Figure 25 is a variant of the rotary washing system, similar to that from Figure 9, except that in this figure the balancing system in the centrifuging is equal to that described in Figures 19 and 21, with the special supports (189) of the mean tub (7), the bushing (185) for the rotation of the internal tub (14) and the flexible hoses (102) intercalated in the connectors of the pipes. The steam feeding to the exhausts with out diffuser (221) is equal to that described in the Figure 9, wherein the generated steam in the fixed chamber (57) is conducted by the tube (68) fixed to the closed box (108), in which the steam is transferred to the rotary vertical portion of the central tube (38) which drives the steam. Furthermore, in this case, the rotary tube (38) also serves as impeller shaft of the two planetary reducers (2) and (225) which move the central hollow post which is divided in two portions. The upper portion of the post (224) rotates, impelled by the above reducer (2); in a single sense such as the helical plate (4) joined to this portion pulls to the clothes, as in above figures, downwards. The bottom portion of the post (1) rotates oscillatory by means of the double planetary special reducer (225) from below, which operates in such a way that the blades (12) joined to this portion of the

post oscillate as a common washing machine. The steam transference to the rotary tube (38) and the operation of the reducers impelled by this tube will be described in detail in the following Figure 26.

[0090] The feeding of the rotary washing system consists of a first great diameter fixed tube (101) which enters centrally below the centrifuging casing (23) and it drives the flow which comes from the pump discharge, in similar form than in Figure 9. This first tube is introduced into a second tube (100) which gets down, joined in its upper portion to the center of the core of the internal tub (14), until support centrally the Pelton-type special turbine (25). By above of the second tube (100) it is introduced into this third tube or rotary tube (48) until this slightly assets by means of a brake shoe (99) over another brake shoe in the upper edge of the second tube. The first and the third tube are introduced with fine adjustment as a pillow block.

[0091] The upper end of the rotary tube (48) is extended gradually in conical form (220) until flow, centrally, and below, within a closed cylindrical chamber (97) of low height, great diameter and housed in the core of the internal tub (14), spite of the bell-shape chamber of the Figure 9 or 7. To guide better the output of the flow in the drainage of the rotary tube (48) over this is placed a conical appendix (98) with the vertex downwards. The water flow which is coming out from the rotary tube (48) circulates radially within the cylindrical chamber (97) and it is extended gradually within the successive concentric sections of the chamber, which increase their area according they are separated of the center. Thus, the speed of the flow is decreasing in its transit by the conical and cylindrical portion; in such a way that the pressure losses by the change in the flow direction are minimal. Moreover, the flow is distributed within a section radial series of the chamber whose walls (22) converge son that (see cutting BB') each section guides the flow towards an output (107), circular and tangential, connected to the input tube (40) of the Venturi from a respective exhaust without diffuser (221), placed in such a way that in the chamber perimeter (97) which its output tube (36), a little curved, discharges in a convenient and tangential direction water jets and steam bubbles which produce cavitation in the sinus of the clothes and impels, by reaction, the rotation of the cylindrical chamber over a rotary tube (48). Additionally are added in each section a curved and radial plates (223) for better guide of the flow towards the exhausts.

[0092] The bottom enlarged portion (226) of the vertical portion of the steam conductor tube (38) is fixed centrally above the cylindrical chamber (97) so that the tube rotates with this and it serves as tube impeller of the reducers, as it was mentioned. On the other hand, the steam driving towards the suction of the exhausts (221) continues by other horizontal tubes (38) which radially are from the bottom portion (226) of the vertical portion of the tube.

[0093] Since it is necessary for the operation of the

planetary speed reducers (2) and (225) that the structure which supports the gears of these stays fixed, a bar (94) joined to the mean tube (7) is welded to the steam transference box (108) and which is integrated to such structure.

[0094] Figure 26 shows in detail the system of the two planetary reducers (2) and (225), housed respectively in the upper (224) and bottom portion (1) in which is divided the central post, and which produce the rotary movement of the helical plate (4) and the oscillating movement of the blades (12) as it was described in the Figure 25. Both reducers are impelled by the same vertical and central portion of the tube (38) which also drives the steam to the special exhausts, as also was briefly mentioned in such above figure.

[0095] As well as in Figure 9, the supporting structure (80) of the reducers gears is integrated to the box (108) which transfers the steam driven by the fixed tube (68) to the upper rotary end of the tube (38) same which enters into the box through a passing hole with mechanical seal (71) to avoid leaks. The box (108) is fastened to the mean tub to fix the entire structure (80).

[0096] Below the box (108) is the planetary reducer (2) which comprises the central gear (79) mounted on the impeller tube (38) the intermediate gear (96) and the box (244) of the peripheral external gear which, to be joined to the upper portion (96) of the central post, makes rotating to this and its helical plate (4) in a single sense. The reducer rotates supported in the bushings (239) over a tubular rounded portion (227) of the structure (80).

[0097] The second reducer (225) which moves to the bottom (1) of the central post really is a double reducer with two systems, aligned one over the other one, of planetary gears (233) and (243); each of these systems has a central gear (235) mounted on a hollow shaft (241), so that these shafts are independent between them and they rotate over the aligned bushings (234). The upper end of the hollow shaft of the above gear and the bottom end of the gear shaft below, outstanding from its bushings, have the radial bars (231). Inside the two hollow tubes (241) runs a ratchet tube (240) with other bars or vertical locking bars (230) in each end in order they can be lashed with the radial bars (231) The length of the ratchet tube (240) is such that, moving upwards or downwards, it lashes by itself with one of the two hollow shafts (241) of the central gears, keeping free the rotation of the other gear. Within the ratchet tube (240) is the impeller tube (38) which rotates in a single sense and drag in its rotation, by a wedge (237), to the ratchet tube (240), which in its turn impels the central gear to which is lashed in this moment.

[0098] The key slot (236 in which is loosely housed the wedge is larger than this, so that the ratchet tube (240) has enough freedom to displace upwards or downwards.

[0099] It is observed, in Figure 26 that in the upper system of planetary gears (233) the quantity of intermediate gears (232) is a non number and in the bottom system (243) the quantity of this gears (242) is a pair number,

therefore, to link to the ratchet tube (240), which rotates in a single sense, to one or another system will make that one of them rotates in contrary sense to the other one. Thus in this way as the peripheral gears of the two systems are joined to the bottom post (1) this will oscillate to certain frequency together with its blades (12), as it get up or get down alternately the ratchet tube (240). The central post supports its oscillation on bushings (239) which rotate over the tube (227) of the structure (80) at the upper portion and over the tube (38) at the bottom. The upper or bottom vertical position of the ratchet tube (240) is controlled by means of a spring (238) and the action of a bobbin (229) over the magnetic nucleus (228) mounted on the ratchet tube (240) or by the cam system.

[0100] Figure 27 is a variant of the industrial washing machine of two tubs of Figure 24, in combination with the portion of the Figure 25. In this new version, the mean tub (7) has flat core but it configures a circular waterway closed together with the shape of the internal tub (14), furthermore, the central connector to the washing system of the feeding tube (8), or of the discharge of the pump (18) from the closed pumping circuit, is vertically for the core of the mean tub, so that it is connected with a rotary tube (48), introducing with slight adjustment this within that as pillow block. In this case, the upper end of the rotary tube (48) is joined to the core of the internal tub (14), as in Figure 25, it flows in conical shape within a cylindrical chamber (97) which feeds a exhaust series (221) without diffuser whose output tubes (36) direct its discharge over a dragging zone, formed this by a curved plates (44) joined to the central body of the small basket (212) and the core (45) of the same small basket which serves to remove the washed clothes, as it was described. The central cylindrical body (219), which constitutes the inner wall of the waterway, is joined to the upper portion of the cylindrical waterway (97) which likewise is joined to the core of the internal tub (14), integrating a single piece.

[0101] The supports (189) of the mean tub, the steam chamber (57) and the feeding tubes (38) of this to the exhaust are the same described.

[0102] The rotation of the internal tub (14) in the centrifuging, which is supported in a brake shoe over a bushing (185) in the core of the mean tub (7), is impelled by a motor (218) whose vertical shaft (245) penetrates axially within the vertical portion of the feeding tube (8) thorough a hole practiced in the bottom portion of a bend to 90° of the same vertical portion of the tube, sealing the passing of the shaft by a mechanical seal (71). The upper end of this shaft is joined to the inner of the bottom enlarged end of the rotary tube (48) by radial enlarged arms (246) which not avoid the flow passing, so that the motor (218), to work, makes rotating the tube together with the internal tube (14). During the washing the motor can rotate in opposite sense to the flow circulation within the tub, so that the dragging zone displaces against this flow and improve the circulation of the clothes.

[0103] Figure 28, is a variant of the washing system of

a vertical washing machine of two tubs (7) and (149) similar, in part, to the systems of the Figures 9 and 25. As in Figure 9, the discharge (8) of the pump (18) is connected, intercalating in this case a hose (102) between both, with a central fixed tube (101) which enters from the centrifuging casing (23) and anchors in this, to then pass through the core of the internal tub (14) through a passing hole slightly adjusted to the same tube, which raises inside the tubs until close the upper portion thereof. At the upper end of this first tube (101) is introduced a second rotary tube (48), with light adjustment so that it can rotate within the first tube, which is supported by a brake shoe (99) over other brake shoe at the end of the first tube. It is observed that the system does not use a central hollow post. To allow, in the centrifuging, the centered rotation over the bushing (185) of the internal tub (14) within the mean tub (7), is used, for instance, the same supports system (189) of the mean tub of the figures 20 or 21.

[0104] The upper end of the rotary tube (48) flows to the inner of a widen bell-shape closed chamber (97) of double wall, in a same shape and with the same function that the similar chamber showed and described in Figure 9, except that, in this case, the periphery of the core of such chamber (97) is connected by convergent surfaces, to the inputs of a series of Venturi tubes (39) belonging to the special vertical exhausts without diffuser, whose output tubes (36) discharge downwards water jets and steam bubbles which cavitate in the sinus of the clothes, generating currents which drag the clothes and which, guided by the curved core (45) of the internal tub, they follow closed paths on vertical planes from the center to the side of the tub and all around this. It is observed in the Figure that the exhaust series (39) are slightly deviated from the vertical a same angle, with the purpose that the small horizontal component of the jets reaction which get out by the output tubes (36) impel, over the rotary tube (48), the rotation of the chamber and the exhaust around the tub.

[0105] Additionally, to help the circulation of the clothes within the internal tub (14), in the core of this, are fixed the radial blades 812) which rotate with the tub when the pump (149) is activated which feeds (17) the jets which impel the Pelton turbine (25) of the internal tub at the centrifuging cycle, as it was described. This action is made in short periods during the washing, alternately with the performance of the pump (18) of the hydraulic circuit of the same washing; in such a way that in this short periods, the clothes which are in the tub core are impelled by the rotation of the blades (12) towards the periphery, pushing and provoking the movement of all the clothes within the currents produced by the exhausts.

[0106] Finally, the steam feeding to the exhaust is made in similar form to that described in Figure 9. On the cupola center of the bell-shape chamber (97) is fixed a closed box (108) for the steam distribution by means of a tube series (38), connected to the inner of the same box, and which drive the steam to each of the suctions

of the different exhausts in which finishes the bell-shape chamber (97). In its turn, the closed distribution box (108) is fed by a tube (68) which enters into the box, by above, through a center bushing and adjusted to the tube, so that the box can rotate over the tube (68) which drives the steam from the steam fixed chamber (57). The input of the tube (68) is sealed by a mechanical seal (71).

Claims

1. A washing, rinsing, wringing machine for clothes within a mean tub which contains another inner tub with holes for the passing of the water flow towards the mean tub; wherein, the tubs are connected in series with a hydraulic closed pumping circuit which consists of a pump which takes continually the water from the inner of the tubs and the discharge, through a feeding tube, again within them, to produce the energy of the re-circulating water flow which moves to the systems; the discharge of the pump is connected, by control valves, either to the washing system or to the wringing by centrifuging to activate to any of the two systems or it is used, optionally, a centrifuge pump for the hydraulic washing circuit and other for the hydraulic centrifuging circuit, each of which works with different rotary sense and they are impelled by a same motor which has rotation change to activate one or another pump; firstly the closed pumping circuit feeds and activates the washing system which consists of a special exhaust without diffuser whose suction is connected to a steam generator to low pressure; this generator is a closed steam chamber in which a heater heats the water, direct or indirectly, so that the exhaust discharges, in certain adequate direction within the washing tub, a water jet with steam bubbles which cavitate in the sinus of the clothes for wash; within the washing tubs is a dragging zone of the clothes, or deflector space of the flow, limited by two surfaces separated to certain distance, on in front of the another one, warped against and converging in certain degree, in such a way that the water and steam jet which gets out by the discharge of the exhaust directed towards such zone, in direction of the convergence, produces a positive impulse over the clothes in this zone, so that the same go circulating for such space; furthermore, the machine has a rotary washing, moving and circulation system of the clothes within the tubs which is activated by the water flow of the closed pumping circuit and it is comprised of a broad tube or hollow post of great diameter housed centrally within the tubes and called central hollow post; this post has a helical wide plates welded in its around and throughout; the rotation of the wide hollow post, which can be continue or slowly controlled by means of a special mechanism, is produced, through a direct coupling or planetary speed reducer, by a motor cen-

tered with the post and impelled by an axial flow turbine or by a rotary tube, also as center motor shaft, which conduces the water flow of the system to be connected, by means of a rotary coupling between both tubs, to the end of the feeding fixed tube at turn is introduced centrally by the upper or bottom of the tubs; for produce the impulse of the rotary tube is used a system of make in this two folding to 90° in its free end which place to the output of the tube in perpendicular position and to certain distance of the geometrical shaft or of rotation of the own tube, in such a way that the water jet which gets out from the tube origins, by reaction, the pair of forces which produce the rotation, at the same time that the jet is projected in the direction of the dragging zone,; this dragging zone is formed with the bottom end of the helical plate as upper surface and, as bottom surface, the same surface of the tub core, or the surface of a horizontal plate welded to a rounded cover, within which is the folded portion of the rotary tube whose final end outstands of the cover by a radial plane which interrupts the form of this, being this cover separated or integrated to the central post, in front of the dragging zone a deflector plate stays placed, which deviates the water flow a little upwards and to the periphery of the tub, as option to move the clothes, are used two planetary central reducers, aligned and with different rotary sense, coupled to the hollow central post which has radial blades at its bottom, in such a way that a tube or centered shaft, which rotates in a single sense, impels alternately by certain ratchet system to the central gear of each reducer to produce in the post and the blades a oscillating movement; the exhaust is connected to a series with the feeding tube or with the rotary, before or after of the rotary coupling between them, and it forms part of the water conduction; the steam chamber and the exhaust can be fixed or rotate together with the rotary system; if the steam chamber is fixed and the exhaust rotates with the rotary system, the steam conduction between the steam chamber and the suction of the exhaust is made by means of a first stretch of the fixed tube which comes from the steam chamber and connected to a second stretch which rotates feeding to the suction of the exhaust, therefore it is used a rotary or mechanic seal intercalated between both tubes; if the steam chamber rotates together with the rotary washing system, the heat of the water within it is made indirectly by a electric transformer whose primary is fixed and the secondary rotates with the fed system, to the same time, to a electric resistant within the chamber; or also it is effectuated using a heater close to the walls of the chamber or the system of a pair of metallic isolated rings which feed electrically by brushes, are mounted on a shaft which rotates together with the steam chamber and they are connected to the resistance by sealed wires; additionally the tubs have

in their inner side wide helical plates to guide the circulation of the clothes, and is disposed a system in the entrance of the pump which disintegrates and grind the loose threads coming out of the clothes; the clothes wringing system by centrifuging in the inner tub consists on produce the rotation of this by means of an horizontal turbine special Pelton-Type, joined to the center of the tube core, which impelled by the water jets which provide a peripheral nozzles series connected to the discharge of the pump from the corresponding hydraulic circuit, so that the turbine housed within a cylindrical box or casing, called centrifuging chamber and is as prolongation of the mean tub core; this Pelton turbine consists of a vertical box in which is introduced to the middle and they are fixed to its side, a distributed series of ladle-shape radial buckets; these buckets direct their output inner edges, slopping a little downward, in almost radial form towards the center of the box, wherein this is connected with a vertical discharge tube from which is evacuated the jets water which impel to the turbine; so that the rotation of the inner tub be balanced, this makes rotating while it floats in the contended water, to certain prefixed level, within the mean tub, in such a way that the inner tub rotates freely respect to any virtual shafts which passes by the center of gravity of the tub and the clothes; furthermore, below the tub is placed a centered counterweight to stabilize the flotation of the inner tube; the machine has a system to condition the flotation of the inner tub within the mean tub, which consists, after previously draining the water of the mean tub, in evacuate by gravity the water of the inner tub through the check valves, then to fill again of water the space between the tubs to the prefixed flotation level; another system to provoke that the inner tub rotates over any virtual shaft which passes by its center of gravity are used the special supports which support to the tub allowing it to displace, freely, in any lateral direction or around of the virtual shaft, to the turn that the same rotates over its geometrical shaft, in such a way that the result of both movements is the rotation of the tub over the virtual shaft, without supporting over a rigid or fixed shaft; the pipes have intercalated stretch of flexible hoses to not limiting that the set of tubs and the connectors to these from the same pipes can move laterally; to close the virtual shaft to the geometrical shaft of the inner tub, this has a peripheral chamber which store certain quantity of a heavy flow; in this case the balancing chamber is annul and forms all the side of the inner tub, in such form constructed which avoid the redistribution of the balancing flow within this to close, when increase the balancing, the virtual shaft gives rotation to the geometrical shaft for the same tub; the inner tub is just of the necessary height to contain to the wet clothes, situated in its core before the centrifuging, and its side is housed within a broadening

which the mean tub has for such purpose, remaining certain space to contain the water in which the inner tub floats and rotates; the separation between the upper edge of the inner tub and the broadening step from the mean one, is covered by means of a annular gate with "L"-shape section, whose vertical portion is slightly adjusted to the diameter of the mean tub and the horizontal portion is supported in such upper edge by material plates resistant to the friction; if the inner tub floats, this is buffered in its oscillation to rotate by anti-friction plates or bearings placed between the cores of the two tubs and between the lateral portion from both; if is used a rotary tube and the inner tub does not have output holes by flotation reasons, it is placed within the inner tub a third tub with multiple perforations, separated a little from that, in such a way that the water flow is drained by a vertical draining tube centered in the inner tub core and which is prolonged until near the core of the centrifuging chamber, wherein is the mouth of the suction tube of the pump, the draining tube has a check valve which avoid the return of the water to the inner of the tub.

2. A rotary washing system which uses a rotary tube coupled by one of its ends to other fixed feeding tube of the flow, so that the first tube rotates by a jet reaction and impels the rotation of the central post of the rotary system; according to claim No. 1, wherein the rotary coupling between these tubes consists in use the system of introduce the fixed feeding tube within the straight end of the rotary tube, with a fine adjustment between its diameters as a pillow block; the axial displacement between both tubes is limited by a ring-shape brake shoe with flat surfaces, firmly mounted in the fixed tube and linked or slightly bounded between a pair of discs, flat rings or rotary plates, also with flat surfaces, which are joined or linked together one to another in its periphery, in such a way that the bottom plate fastens the end of the rotary tube and upper, passing though the fixed tube, it serves as support of the rotation over the other side of the brake shoe; other means use for this consists in adjusting firmly, as pillow block, a bushing to the external diameter of the rotary tube, slightly joined together the bushing between its lateral faces by a bottom brake shoe mounted on the rotary tube and a upper screw nut screwed to the free end of the same tube, so that the surfaces in contact are flat, this set is coupled to the fixed tube screwed to the external diameter of the pillow block bushing to the bottom enlarged diameter of the end of this fine tube.
3. A rotary washing system to move the clothes within a machine of two tubs and in which the central hollow post rotates impelled, through a planetary speed reducer, by an axial turbine propelled by the circulating

water energy which generated a pumping system in a closed circuit, connected in series with the tubs; furthermore, the pumping circuit activates a special exhausts without diffuser which launches water jets and steam bubbles within the tubs for washing by cavitation; of the center of the internal tub gets down a vertical draining tube, with check valve, which flows near to the suction tube of the pump; according to first claim; wherein the rotary system of this machine at the center of the core internal tub, as continuation of the vertical draining tube and housed of the central hollow post, is raised a wide tube until end in a planetary speed reducer at the upper portion of the tubs; in this reducer enters, below and through a sealed bearing box, a vertical and central shaft which moves the entrance of reducer entrance; the bottom end of this central shaft is coupled to the vertical and axial turbine, which is below of the internal tub core and it is housed in a broadening of the tubes, as turbine casing; on the other hand, the output shaft of the speed reducer, which centrally outstands by above of the same reducer, is welded to a lid of the upper end of the central hollow post, so that the upper zone of the post stays tightly closed; additionally the post has blades welded to the same near to the tub core; the hollow post and the second wide tube within their inner have, just in the portion closed to the tub core, a holes series for the passing of the water flow, in such a way that this flow is the charge which moves to the turbine, which is discharged by the vertical draining tube; the side of the internal tub lacks of holes, except that in the upper by above of the flotation level.

4. A rotary washing system impelled by the water jet reaction and steam bubbles which launches the rotary tube over a dragging zone; the bubbles are generated by a special fixed exhaust intercalated in the feeding duct and whose suction is connected to a steam fixed chamber housed within the central hollow post or in other place; the system is fed by a closed pumping system, with vertical connector of the feeding tube by the upper portion of the tubs; according to claim No. 1; wherein the feeding tube is directly connected to the Venturi of the exhaust and this, or part of it, passes through and stays centrally housed, sealing its entrance and output, within the steam chamber, so that the suction chamber of the exhaust can be connected directly with the inner of the steam chamber by a small tube which finished in the upper zone of this; or in the steam chamber can be fixed in any other place with a adequate connection tube to the suction of the exhaust; after its through, the output tube of the exhaust, of reduce diameter or small, continues without diffuser or with the same diameter until that it outstand the enough of the chamber core for articulating, by a rotary coupling, a rotary vertical tube of equal small diameter

than, following its folds, it discharges the water jet and steam over the dragging zone.

5. A rotary washing system with losses decreasing impelled by the water jet reaction and steam bubbles which launches a rotary tube by jet reaction; the bubbles are produced by a special intercalated reducer in the flow duct and whose suction is connected to a steam fixed chamber housed in the central post; the system is fed by a closed pumping circuit, with vertical connector of the feeding tube by the central portion of the tubs; according to claim 1; wherein the feeding tube of big diameter fastens the steam chamber centrally passing through it, so that the end of this wide tube, outstanding of the core of the steam chamber and by a rotary coupling, is articulated directly with the rotary tube of the same big diameter rotary tube and whose end, after the folds, it finishes and connects with the Venturi of the exhaust without diffuser which directs its discharge toward the dragging zone; and because the conduction of the steam towards the suction of the exhaust is made, initially by a fixed duct which consists of a first stretch of thin tube which suctions the steam within chamber thereof and then it is introduced, by the wall and downwards, within the stretch of the wide and fixed feeding tube which passes through the steam chamber, to finish, finally, at the upper end of the bore of a gross wall vertical bushing which is fixed concentrically within this feeding tube; the other portion of the exhaust is rotary and it consists of a second stretch of thin tube whose upper end is introduced, below and with light adjustment as pillow block, in the bore of the vertical bushing to can rotate within this, so that the same tube is prolonged downwards until enter centered into the rotary tube, and then folding to get out through this wall of this, and connecting directly with the suction of the exhaust; to avoid the steam leak in the bushing join and the second tube, in this is tighten a polished ring which is pressured, by a spring, against the bottom face of the bushing equally polished, therefore, so that the spring can execute such pressure, in this second tube is intercalated a short stretch of flexible hose; instead of the tighten ring and the hose stretch is used a mechanical seal common in the bushing union and the second thin tube.
6. A rotary washing system with losses decreasing impelled by a jet reaction in a vertical rotary tube of big diameter and articulated, by a rotary coupling, to the feeding tube; the bottom end of the rotary tube finishes in a exhaust without diffuser which discharges the water jet with steam bubbles over a dragging zone and it has its suction connected to a steam chamber with the indirect calefaction which rotates together with the rotary washing system; according to Claims 1 and 5; wherein the rotary tube fastens

to the steam chamber centrally passing through it, so that the steam chamber is directly connected, by means of a thin tube, with the suction of the special exhaust.

7. A rotary washing system of a washing machine for clothes, whose rotation is produced and supported in the rotation of a centered tube of big diameter which drives the flow and it is impelled by a jet reaction; the upper end of the rotary tube is joined to other special duct by which continues the flow and change 180° the direction of this increasing a minimal the pressure losses; such duct finishes in a special exhaust whose suction is connected to a steam cylindrical chamber which is housed within the central post and rotates together with the system, so that the exhaust discharges, towards a dragging zone, a water jet and steam bubbles to low pressure in perpendicular direction and to certain distance of the central rotating shaft of the system; the system is fed by the discharge tube of the pump of a closed pumping circuit in series with the tubs; according to claim 1, wherein the feeding of the water flow is made connecting the discharge tube of the pump with a passing hole practiced in the center of centrifuging chamber core, over which is hanged a short vertical stretch of hose of enough flexibility to displaces laterally in any direction; by above, the hose is joined to other short stretch of a first rigid tube which is introduced to certain distance into the bottom end of a second vertical tube which joined to the center of the internal tub core this, raises within the tube to a greatest height to the flotation level of this; within the second tube is introduced, by above, a third tube or rotary tube which is settled by means of flat limits in the upper edge of hat; the three tubes have a big diameter and the adjustment between them is a fine adjustment as pillow block, in such a way that the corresponding tubes, one inside the other one, can rotate between them just with liquid leaks by the union, to the same time that the flexible hose allows the lateral displacement and of the washing system together with the internal tube during any eccentric rotation of this; by above of its settling over the second tube, the rotary tube finishes in a bell-shape closed chamber or copula of double wall and great section that, surrounding the tube, it extends until the tub core, so that the upper end of the rotary tube or third tube, increasing gradually its diameter, flows to the inner of the chamber at the peak of its inner wall, the chamber has, by above this draining, a conical inverted appendix which has the function of deviating 180° towards the core of the water flow chamber which gets out from the rotary tube; the two wall of the double bell and the core of this converge gradually, near to the tub core, until form the ignition of the output tube, conical and tangential to the perimeter of the chamber core, whose final end finishes

in the Venturi of the special exhaust without diffuser which launches the flow redirected to the dragging zone; the steam chamber feeds to the suction of the exhaust by means of a thin and centered tube which, starting of the upper inner zone of the chamber, it passes through the core of this and its bottom end is joined to the dome of the bell-shape chamber, continuing the connection from this end to the suction of the exhaust by other duct; thus, the bell-shape chamber drags in its rotation to the steam chamber to be joined by such thin tube; if a planetary speed reducer transmits this rotation to the central post, above of the steam chamber a central shaft impeller of the reducer is raised and, by above of the reducer, a rounded plate no rotary registers and supports by a bushing in its center the rotation of this shaft and, with other bushings, it supports the shafts of the intermediate wheels of the reducer, furthermore registering in its periphery the rotation of the central post; this support plate is joined in its upper portion to the lid or washing machine structure by a hose pipe or flexible tube which allows lateral displacements and it resists torsion efforts to avoid the rotation of the plate; over an extension of the impeller shaft is mounted the electrical feeding system indirect to the resistance of the steam chamber, straying this system housed within the flexible tube.

8. A variant of the rotary washing system which has the rotary tube by jet reaction fed by means of a closed pumping circuit, through a central passing hole located in the mean tub core of a washing machine of two tubs; this tube finishes, within the internal tub, in a bell-shape chamber of double wall which flows in the special exhaust with steam chamber; according to claim 7, wherein the rotary washing system rotates firmly centered with the geometrical shaft of the mean tub, for which a short stretch of vertical tube anchored over the central passing hole in the centrifuging chamber core or from the mean one, as continuation of the feeding tube, is introduced within the rotary tube, with fine adjustment between both as pillow block, until the bottom end of this rotary tube is supported with a annular break shoe of flat surface over other brake shoe mounted equally on the basis of the short input tube; in the core center of internal tub is raised, by above of the flotation level, a wide tube which serves to introduce within the same tub the rotary tube which finishes, within the internal tub, in the bell-shape chamber; the diameters of this passing tub have enough loosening respect to the rotary tube and to the inner wall of the bell-shape chamber, to avoid that the passing tube grates on the rotary tube or with the chamber during the lateral movement of the passing tube and the tub in the centrifuging cycle; the steam chamber is fixed to any adequate place of the washing machine and its connection with the suction of the exhaust is initiated

with a first thin tube which connects to the upper zone of this steam chamber with the inner of a closed small passing box of the steam, housed at the upper of the central post and fixed centrally to the washing machine structure; the steam conduction continues by a second thin and vertical tube, which has in its bottom end welded to the dome center of the bell-shape chamber, therefore it rotates with this, and its upper end enters into the steam passing box, thus it registers its rotation passing through a centered bushing in the core of the same box; furthermore, the entrance of the tube to the passing box is sealed by a rotary or mechanical seal; finally, the bottom end of the vertical tube is connected by a third tube or hose, with the suction of the exhaust to complete the connection between this and the steam chamber; if is used a speed reducer, the entrance gear of this is mounted on the second thin conduction tube, so that the same serves also as impeller shaft of the reducer.

9. A variant of the lateral movement system. Without rotate, of the upper plate which supports to the shafts of a planetary speed reducer, transmitter of the rotation of the central impeller shaft to the hollow post of a rotary washing system with a lateral displacement during the centrifuging, so that this plate supports this articulated to a system which allows it the free lateral displacement but impedes it to rotate; according to claim 7; wherein it uses the system of two running which run perpendicular one respect to the other one, for which in the upper portion of the cylindrical box of the supporting plate is fixed a horizontal bushing, within which is freely moving a rounded bar joined perpendicularly to other bars which run within other bushings perpendicular to the first one; the second bushings are joined to a plate fixed to the washing machine structure, so that the cylindrical box and, therefore, the supporting box of the reducer shafts, carried by the rotary system, can move, without rotate, in any lateral direction combining both displacements; or because, as option, it uses the system of one running over a bar which rotates over one of its ends; system which consists of a horizontal bushing which rotates, transversally to its geometrical shaft, over a vertical pivot placed at the upper of the cylindrical box and of a bar which can slide within the bushing and rotates horizontally over one of its ends articulated to a pivot fixed to the washing machine structure; the rotation of the supporting plate is limited by limits placed over the box of this to each side of the bar.
10. A special control mechanism which stops or liberates, slowly and to certain frequency, the rotation of a rotary washing system which is impelled by a central shaft which transmits its rotation to the central hollow post by means of a planetary speed reducer;

according to claim 1, wherein the mechanism consists of a first thick horizontal ring and of rectangular section, whose upper face is divided in several equal sections which comprise, each one, of a valley or split plane followed of a slope which finishes in a flat crest, as cams path; centered within the central hollow post and joined to the inner of this by the arms, the first ring rotates together with the post and by its center passes the tube or impeller shaft; over each section of the cam path is supported and slides one of the legs which, in whole, support the weight of a second aligned ring, by above, with the first one; the second ring is lashed, by means of a longitudinal wedge with slight adjustment, to the shaft or rotary tube which is dragged by it in its rotation, but it allows it get up or down along to the same shaft, so that the second ring to rotate, according the reduction relation, respect to the first ring or cam path and supporting its legs in this, it is pushed in certain point upwards by cams, in such a way that it is lashed by slots or friction surfaces against the bottom face of a third no rotary ring, stopping all the system; then, with a lever and an actuator shoot, the third ring raises lightly to liberate the system and allow to it and to the second ring continue their rotation, settled this second ring its legs over the cam low path and separating the third ring, until the both rings jam again in the following tall section of the cams path, repeating this stopping pauses and rotation.

11. A vertical washing system, fed by a closed pumping circuit with reduced losses, which comprises a central post with helical plate, a steam chamber and special fixed exhaust, whose output tube of this is coupled to a rotary tube which discharges water jets and steam bubbles over a dragging zone; thus, the connectors of the pumping circuit tubes stay fixed respect to the tubs during the lateral displacement of these during the centrifuging; according to claim 1, wherein the feeding tube enters as deep as possible, by above, within the central hollow post wherein it is connected directly with the Ventury and the output tube of this, in vertical position, is connected with a rotary tube as short as possible and of equal diameter than the output tube; the internal tub core is rounded, downwards, of the center toward the periphery, similar to the middle curve of a toroid, and the rotary tube is folded a little degrees respect to the vertical, thus, it stays tangent to the curvature of the central elevation of the tub core and between this curvature and a conical deflector fixed around the bottom end of the central post; the rotary tube is impelled by a low speed small motor and isolated inside the central fixed post; so that the shaft of this motor is coupled to the coupling rotary plate, to make rotating to this.

12. A vertical rotary washing system, fed by a closed

pumping system with reduced losses, which comprise a central hollow post with a helical plate, a steam chamber and a special fixed exhaust, whose output tube of this is coupled to a rotary tube which discharges a water jet and steam bubbles over a dragging zone; thus, the connectors from the pipes of the pumping circuit stay fixed respect to the tubs during the lateral displacement of these during the centrifuging; the internal tub rotates, impelled by a Pelton-type turbine, over its geometrical shaft within the mean tub; according to claim 1, wherein the connector of the feeding tube is by the central bottom portion of the internal tub through a passing tube, which passes through and fastens to the Pelton turbine, thus, this passing tube finishes centrally in the internal tub core; the feeding tube is connected directly with the Venturi of the special exhaust, which is housed as near as possible of the upper end or end of the passing tub, so that the rotary tube of the exhaust outstands a little of the tub core and it is a little curved in such a way that it discharges laterally the water jet and steam bubbles within the internal tub; on the other hand the passing tube also serves, impelled and joined to the Pelton turbine, as rotation shaft of the internal tub over a central bushing of the mean tub; by above of the ending of the rotary tube, the central post is joined to the internal tub core by means of two or three thin legs, so that this post, together with the helical plates and the internal tub, is made rotating in small pauses impelled by the Pelton turbine, alternated with the washing cycle; the rotation of the rotary tube can be made by a motor with reducer coupled to this and closed in a box within the post or by a planetary reducer coupled to the rotation of the post.

13. A chamber to balance the rotation of a internal tub which, within a mean tub, wrings the clothes by centrifuging; this chamber forms the side of the internal tub, is closed, of annular shape, it contains a heavy flow and it is constructed in such for that it avoids the redistribution of the flow within it, to close the rotary virtual shaft to the geometrical shaft of the tub when increases the balance; on the other hand, the internal tub tends to rotate freely over the virtual shaft which passes by its center of gravity, without supports in a rigid shaft; according to claim 1; wherein the closed balancing chamber comprises a first vertical and annular portion, which forms all the side of the internal tub and is divide with vertical plates in a cells series; the chamber is prolonged, below the tub core as double core, in a second cylindrical-shape portion, of small height and without divisions, within which is stored the flowed material which, when the tub rotates, it enters by the bottom of the cells, distributing within each cell according its distance to the virtual rotary shaft; some of the vertical cells have a bottom horizontal plate which separate them from

the rest of the chamber; furthermore of a holes series on the wall which is in the inner of the tub, and, in the opposite wall, other holes series stay by above of the flotation level of the tub, in such a way that by these holes get out the water of the internal tub; within this second type of cells are placed filters which catch lint; the second cylindrical portion of the chamber contains a horizontal bar which can rotates in its middle portion respect to a co lineal with the geometrical shaft of the tub; on one of the ends of this bar is fixed a vertical light sheet near to the entrance of the vertical cells of the chamber, with dimensions and curvature such as the sheet can limit the entrance of flow in some cells; on the other end of the bar is inserter a counterweight which can slide towards the end pressing a light spring to compression fixed at the peak of the bar.

14. A system to condition the flotation, within the mean tub and a prefixed level, of the internal tub which, to centrifuging the clothes, it rotates by means of a Pelton turbine which is impelled by the water jets which launches a nozzles connected to the discharge of the mean pump of a closed pumping circuit, whose suction tube is centrally connected to the core of the centrifuging chamber; the internal tub has, centered in its core, a vertical draining tube with check valve which prolonged until arrives very near and in front of the mouth of the suction tube of the pump; according to claim 1; wherein the side of the man tub has a height of the flotation level, a draining opening connected to the suction of a small pump auxiliary which discharge to the drainage; furthermore, in dynamic conditions of the flow; the net charge of the suction of the mean pump through of the internal tub and the vertical draining tube is greatest that the net charge of the suction on the paths, with greatest friction losses, of the spaces between the tubs and the draining tubes of the turbine towards the same suction of the pump; the control of the pumps makes working first to the pump to drain until the flotation level and then it operates it together with the mean pump.

15. A system to condition the flotation, within the mean tub and to a prefixed level, of the internal tub which, to wring by centrifuging the clothes, it rotates impelled by means of a special Pelton turbine; the system consists of previously draining, by an auxiliary pump, the water to the core of the mean tub and to drain by gravity the water of the internal tub through the check valves at the core thereof, to then fill again of water the space between the tubs to the prefixed level of flotation; according to claim 1; wherein the machine separately has a reserve container closed with a volume equal than the water which contains the mean tub when inside it floats the internal tub to the prefixed level; the auxiliary pumping has its discharge connector do the core of the container and

by above of this is connected a draining hose to the general drainage; an opening to the flotation level in the side of the mean tub is connected by tube with valve to the upper of the container; all the system is connected, by tubes and control valves, in such a way that, after to draining until the level of the mean tub core the water of the tubs through the reserve container, are inverted the connections of the auxiliary pump between this container and the tub, so that the waste water stored in the reserve container be returned to the mean tub.

16. An special support of a vertical internal tub which, inside of a mean tub, it wring clothes by centrifuging, in such a way that this support allows to the internal tub freely move laterally around any virtual shaft which passes by the center of its gravity, to the run that the tub rotates over its geometrical center; according to claim 1; wherein centered below the core of the internal tub, the special support consists of a rounded platform which has a central hole which is passed through, keeping a small loosing, by a central guiding tube or cylindrical prolongation of the core from the same tub; on the platform is fixed a circular series, concentric with the tub, of vertical wheels with its shafts directed on radial sense towards the center of the hole, so that this wheel support the weight and the rotation rotating over the core thereof; furthermore, other horizontal wheels series, with their shafts fixed also to the platform, are distributed around the central hole of the platform, in such a way that the wheels, rotating over the peripheral surface of the guide tube, keep to the tub rotating over its own geometrical center; the platform has additionally below it a distributed supports series which supports the set an they allow the free displacement of the platform to any lateral direction; each of this supports uses the system of a horizontal bushing which rotates, transversally to its geometrical shaft, over the pin fixed below the platform and it slides to the same time, mounted as running, over a horizontal rounded bar which oscillates or displaces angularly and horizontally over one of its ends joined this end to a vertical bushing which rotates over a pin anchored on a mamelon which outstands of the core of the mean tub; on the other end of the bar is mounted a vertical wheel and perpendicular to the bar, of such diameter that it rotates supported over the core of the mean tub supporting its weight.

17. A variant of the system of the platform which supports the rotation of the internal tub which centrifuging clothes, in such a way that the system allows to the set displaces in lateral form around any virtual shaft which passes by the center of gravity of the tub; according to claim 16, wherein the platform uses, to be supported and achieve this movement the method of two systems or running sets which run in perpen-

dicular direction one to another, so that the platform is fastened to the first running set and this to its turn runs over the second set, fixing this last to the structure of the washing machine.

18. A washing and wringing machine of two tubs, which has a rotary washing system and a centrifuging system of the clothes within the internal tub; each of these systems is fed, below the internal tub, by a closed pumping circuit which uses a centrifuge pump for the washing circuit and other for the centrifuging, each of them works with different rotation sense and they are impelled by a same motor with interchanging rotation, according to claim 1; the internal tub, rotating over its geometrical shaft, is supported by a platform which laterally displaces in any sense, according to claim 16; wherein it is used a submergible motor to move both pumps, so that all the set, of the two hydraulic circuits and the motor, hang from the platform and it moves together with this within the centrifuging chamber during this cycle.

19. A special support of a vertical internal tub which wring the clothes by centrifuging and it is housed within a mean tub, in such a way that the inner tube rotates, without supporting over a rigid shaft, over the virtual axis by the center of gravity of the tub and the clothes; for that, the supports allows freely to the inner tub laterally displaces around any virtual rotation axis, to the turn that the tub rotates over its geometrical center; in this case the mean tub works as support of the inner tub, thus, this rotates with its geometrical axis over a bearing fixed in the center of the core of the mean tub; according to claim 1; wherein the mean tub, to displace freely in lateral form, it uses below its core a supports mechanism series similar to those from the wheels which align automatically with the direction of the displacement towards any side; each support of these comprises a horizontal flat bar and sufficiently large that in one of its ends is articulated to a first bearing of vertical axis or fixed pivot to the core of the tub, so that the bar can oscillates horizontally over such end; furthermore, the flat bar slides lineally, in any of both sense, supported over the upper periphery of a vertical wheel, or from virtual axis, whose mounting is vertical position can rotates horizontally over other pivot or second bearing of vertical axis, in such a way that, maintaining always a minimal distance between the supporting wheel and the first bearing, the bar is aligned with the displacement direction of the tub and the wheel with the direction of the bar in any time; below the box which supports the second bearing is welded a vertical guide bar which runs inside a supporting bushing welded to the structure of the washing machine; between the box of the second bearing and the supporting bearing is placed a spring which works to compression, supporting the weight of the set.

20. A variant of the supports system of the mean tub so that this displaces freely in lateral form, to the turn that the inner tub rotates over its geometrical axis within the mean one; according to claim 19, wherein is used a special supports series, similar to a vertical meeting of transmission, to hang from these to the mean tub, around of its upper periphery; each of these supports comprises a crossbeam formed by the joined axes and crossed to 90° in their center, so that a vertical bar hang and oscillates or rotates angularly respect to its upper end over one of the axes and the other axis rotates over itself fastened to the machine structure; this bar passes through loosely the hole of a plate or ear welded to the mean tub so that a sprint to compression, fastened to the bottom end of the bar and supported below the plate hole, supports the weight of the tub; in such a way that the oscillation of the bar in any sense allows the lateral displacement in all the direction of the mean tub; or it is used a toggle articulation to hang, from the structure, the upper end of these bars which support to the mean tub.

21. A rotary washing system, without central post, of a vertical washing machine fed by a vertical tube of big diameter connected to the discharge of the pump of a closed pumping circuit in series with the tubs, so that the tub enters within the tubs by a passing hole, practiced in the center of the core of the centrifuging chamber; on ht end of the first tube is introduced a second vertical tube which rotates over that, by a rotary coupling, an flows , centrally, within a closed bell-shape chamber of double wall and big section, which changes 180° the direction of the flow with minimal losses of pressure, so that the flow is directed within the chamber towards the Venturi tubes of a special exhaust series without diffuser, whose directions are fed from a steam generator fixed chamber through a closed passing box fixed centrally to the bell-shape chamber, which rotates with this and it distributes the steam to the different suctions of the exhaust, using a mechanical seal to join the fixed portion with the rotary portion of the steam conduction; in such a way that the exhausts produce water jets and steam to low pressure generating currents which drag to the clothes, with the help of the rounded core of the inner tub, in closed descendent, ascendant and radial paths, around all the space of the inner tub; so that these jets, by reaction, produce the rotation of the bell-shape chamber and from the exhaust: the inner tub, impelled by a Peton-type turbine, rotates over its geometrical axis within the mean tub, according to claim 1, 7 and 8, wherein the passing hole in the core of the inner tub so that the feeding tube enters have a light adjustment with this, and the tube raises within the tub until near to its upper zone of this wherein it is coupled with the second tube or rotary tube which finishes

and flows in the center of the upper portion of the bell-shape chamber, so that the periphery of the core of this is connected to the Venturi tubes of a special exhaust series without diffuser whose output tubes direct to the water jets and the steam bubbles towards the core of the inner tube, forming the dragging currents of the clothes in closed paths within the tub; the output tubes of the exhaust direct such jets in slightly deviated direction a same angle of the vertical, so that the horizontal component of the reaction thereof impel the rotation, over the second tube, of the bell-shape chamber together with the exhaust, additionally and as auxiliary system, in the core of the inner tub is fixed a radial blades series in order to, when the rotation of this tub is activated by means of a Pelton turbine, such blades impel towards the periphery or the side of the tub the clothes which are in the zone of the same blades.

22. A rotary washing system with a central post, a steam chamber and a exhaust series without diffuser, fed by a closed pumping circuit with reduced losses, whose rotation is supported in a centered rotary tube, which drives the flow and rotates impelled by a jet reaction; the flow by a central tube in the core of the centrifuging chamber and coupled, introducing one within the other, with other tube fastened to the core of the inner tub and with the rotary tube, according to claim 1: wherein the upper end of the rotary tube increases gradually its diameter in conical form to flow, centrally and below, within a cylindrical closed chamber, of few height and ample diameter, housed in the core of the inner tub; in such a way that, with minimal losses by the change in its direction, the flows decreases its speed to radially pass through the conical section and the cylindrical as the area of these sections increases; the cylindrical chamber has over the drainage of the rotary tube a conical inverted appendix; the flow which transits on the cylindrical chamber is distributed within a radial section inner series of the chamber, so that the walls of each section guide, converging, part of the flow towards the entrance tube of a respective exhaust placed at the periphery of the cylindrical chamber, and whose output tube, short and little curved, discharges water jets and steam bubbles in a adequate tangential direction ; within each radial section are placed vertical curved plates, conveniently to help to the flow to direct to the entrance of each exhaust.

23. A system of two planetary reducer, aligned one above the other one, with different rotation sense and centrally coupled to a central hollow post with radial blades of a rotary washing system, so that the centered axis which rotates in a single sense is impelling alternately, by a ratchet system, to the central gear of each exhaust, to produce in the post an oscillatory movement; according to claim 1, wherein,

the central gear of, each exhaust rotates over a hollow axis, so that within both axes, aligned and independent, is housed loosely a ratchet rotary tube which can be displaced vertically in such a way that, by any ratchet system, in its upper position is lashed with the hollow tube of one of the central gears and in its bottom position is lashed with the hollow axis of the other central gear, keeping free the first axis; the number of intermediate gears of a reducer is pair, and the number of intermediate gears of the other ones is non, thus, although the two central gears always rotate in the same sense, the peripheral gears of each reducer will rotate in opposite sense, one respect to the other one, as is impelled alternately each central gear by the ratchet tube; to its turn, the ratchet tube is rotated by a second tube or axial impeller axis which is inside of that, coupled by a wedge adjusted slightly so that they allow the vertical displacement of the ratchet tube; the vertical movement alternated of the ratchet tube is controlled and the actuating of a bobbin over the magnetic nucleus mounted in the ratchet tube or by a cam system, to the required frequency.

24. A washing or wringing machine by centrifuging of front-loading two tubs or horizontal axis, which comprises a tub or mean drum with a front opening, circular and beveled, which is tightly closed by a circular lid with conical periphery and wrapping sealed; within the mean drum is housed other horizontal tub or inner rotary drum, which also has a front opening, equally circular and beveled, to introduce or get out the clothes, furthermore of a blades and perforations series along the inner side; within the inner drum is a special exhaust fixed without diffuser, with its suction connected to a chamber generator of steam also fixed, which direct the water jet and steam bubbles to low pressure over the water and the clothes which are shoveling and settling in the bottom side of the drum to give rotations to this; in the wringing of the clothes the inner drum rotates joined to a Pelton turbine common impelled by water jets launched by nozzles connected to the discharge of the pump; an annular balancing chamber series round the side of the inner drum; these two systems are activated by a closed pumping circuit; according to claim 1, wherein the center of the mean drum, towards the inner of this, is welded a first horizontal wide tube with free passing; this first tube is in a second wide tube welded in the center of the core of the inner drum and placed outside of this, with slight adjustment between both tubes as pillow block, so that the inner drum and its tube rotate over the tube of the mean drum; from the side front, the inner drum is supported firmly in a periphery conical wheel which registers its conicalness in the beveled of the same drum, thus, the drum rotates together with the wheel whose axis is supported by a sealed bearing fixed

to the lid of the mean drum and pushed by a spring, to adjust the registration pressure between the conical wheel and the opening of the inner drum; to wash, the feeding of the water flow within the inner tub is made connecting the tube of the discharge of the pump with the back end of the wide tube of the mean drum, using an intermediate conical amplification and a deflector nucleus also conical to couple both tubes; the front end of this wide tube finishes, centrally and within the inner tub, in the basis of a horizontal cylindrical box, along the wide tube, and including the cylindrical box, is placed a helical plate which produces to the water flow a rotary component to its speed to enter in the cylindrical box; within the cylindrical box and from the central connector of the flow thereof, a volute of big section directs the flow towards the periphery of the box to get out by a tangential tube to the perimeter of the same box; the tangential tube finishes in the Venturi of the exhaust which directs its discharge downwards and in form almost tangential, over the blades of the inner drum thus, the water jet and the steam bubbles beat over these and makes rotating the drum.

25. A variant of the machine for washing and wringing clothes of two tubs or free drums of horizontal axis, in which the mean drum has in its center of its core a wide tube, with free passing to the inner of the secondary drum or internal, over which rotates another wide tube joined to the inner drum and in which is mounted a Pelton turbine; this machine uses a closed pumping circuit to feed a special exhaust without washing diffuser and other circuit to feed the water jets which impel to the Pelton turbine which produces the rotation of the inner drum; according to claim 1 and 21; wherein the special exhaust is housed within the wide input tube joined to the core of the mean drum and is fed directly connecting the discharge tube of the pump of the washing circuit with the Venturi of the special exhaust, in such a way that the output tube of reduced diameter of this exhaust is as short as possible and outstand a little of the core of the inner drum, thus, its end is curved a little downwards in such a way that it directs the water jet and steam bubbles to low pressure over the bottom side of the inner drum; furthermore, this end of the output tube is covered with a disc of rounded surfaces to avoid that the clothes be hanged with the same end of the tube; during the washing, the performance of the washing circuit is alternated with the operation of small intervals of the centrifuging circuit, with the purpose of make rotating a little the inner drum and the clothes being shoveled during their washing.
26. A machine of two tubs of horizontal axis to wring clothes by centrifuging, which comprises a tub or horizontal mean drum within which is a inner drum which

rotates over its geometrical center with the clothes by wring within it; the drum is suspended of a special supports system which allows to the set of both drums displace laterally around the virtual axis which passes by the center of gravity of the inner tub; the pipes connected to the drums have intercalated stretches of flexible hoses to allow this displacement of the set; according to claim 1, wherein the mean drum is moved laterally hanged of a support pairs series, a support of each side of the drum, which use the system of a running which slides over a bar which, articulated in one of its ends, slides angularly; and therefore, one of these supports, which works in perpendicular planes to the drum axis, comprises of a welded ear to the mean drum which supports the running bushing which can rotate, transversally to its geometrical axis, over a horizontal pivot fixed to the ear and parallel to the drum axis; within the bushing slides a rounded vertical bar which hangs of its upper end articulated to a pivot over which can oscillate or rotate in angular form, as pendulum, in a perpendicular plane to the axis of the drums; in the bottom end of the oscillatory bar is fixed a spring to compression which pressures over the bottom face the running bushing to support, together with the other supports of the series, the weight of the drums; each of the pivots of the upper end of the two oscillatory bars, placed by pair, are each in the respective side of the mean drum, are fastened to the corresponding ends of a horizontal bar, placed transversally by above of the drum, in whose middle portion is raised a vertical shoot, in which are articulated, in its upper end, two rotary bars slopped against downwards with certain angle as normal position and one to each side of the shoot; the opposite or bottom end of each of the slopped bars are articulated, in rotary form, to a respective end of a second rounded bars and horizontal which run, opposite between them and limited each one by a spring to compression, within a fixed bushing to the washing machine structure; thus, the force of vertical movement of the drums upsets and it is projected, horizontal and vertically by the slopped bars, in two opposite forces over the springs and in two pairs of torsion opposite over the bushings, which just provoke internal efforts in the washing machine structure and in the fastening of this to the floor.

27. An industrial machine for washing clothes in big quantities which uses a special exhaust series without diffuser fed by a closed pumping circuit of the water which is in the washing tub; these exhausts have their suction fed by a steam generator to low pressure and discharge water jets with steam bubbles to negative pressure within the washing tub to wash clothes by cavitation and in the adequate direction of the water and clothes within the tub, according to claim 1, wherein the washing tub compris-

es a waterway of enough dimensions and of closed path in oval or rectangular shape with corners in certain direction to make rotating the clothes around the tub, thus, the suction of the recirculating pumping system is disposed in the core of the pump; furthermore, in the inner portion of the sides of the tub are placed a blades series slopped to provoke the shoveled of the circulating clothes.

28. A wringing system of the washed clothes in an industrial washing machine according to claim 26, which consists in to pass the clothes, guided by a carrier band; between two rotary rollers which press the clothes around them; wherein it is used a first carrier perforated bad comprised by two stretch and placed horizontally by above of a straight portion of the washing machine in waterway form; this first carrier band comprises a initial stretch which can rotate slowly downwards introducing in slopped form until its end touches the core of the waterway; thus, the initial stretch goes catching and raising the clothes towards the final stretch which stays horizontal; this final stretch of the first band carries the clothes to its end to throw them in a second carrier band, which is below the first one, which rotates toward the pair of rotary rollers which wring them between them by pressure.
29. A variant of the industrial machine for washing and wringing clothes in a mean washing tub in waterway form of closed path which washes by water jets to low pressure which discharge, within the tub, a special exhausts series without diffuser fed by closed pumping circuit, according to claim 26, for the centrifuging, the mean tub of this is fastened by special supports which allow it displaces laterally to any direction while a inner tube rotates centered within the mean one; for this, the connection pipes with the pumping system comprise a flexible stretch, according to claim 20; wherein the mean washing tub has a waterway form of circular closed path, and inside it is housed, with certain separation between them, the inner tub which has equal form than that and it serves to centrifugation the clothes making rotate this by a vertical motor fixed in the center of the mean tub and to which it is coupled; additionally, within the inner tub is housed a small basket, with the same profile or similar shape to the tub, which is coupled with a conical body with eyebolt to easy registration with the coupling of the motor and it rotates linked to the inner tub, thus, this small basket serves to remove the clothes pulling up this small basket by means of a crane linked to the eyebolt.
30. A variant of the industrial machine for washing and wringing clothes in two tubs and one small basket, to remove the washed clothes which have shape, in whole, of a big waterway of circular closed path, with-

in which the washing is made by exhausts without diffuser which discharge over a dragging zone and they are connected to the periphery of a cylindrical special horizontal chamber, housed in the core of the inner tub, which in its turn is connected, centrally and below, to a rotary tube which flows in conical form to the inner thereof; the flow is provided by a closed pumping circuit whose draining or feeding tube is coupled to the rotary tube, introducing this within that with light adjustment; the mean tub has a supports system to balance the rotation of the inner tub which is produced by a vertical motor placed centrally under the tubs; according to claims 1, 21 and 28, wherein the central connector of the feeding tube to the system is vertical through the first core of the mean tub and it is coupled directly with the rotary tube joined to the cylindrical chamber; the cylindrical chamber which forms the inner wall of the waterway is fixed to the upper portion of the cylindrical chamber and this, together with the rotary tube, are integrated to the core of the inner tub; the cylindrical central body of the small basket to remove the clothes, adapted to the central cylindrical body of the waterway, has curved plates, horizontal and radial which together with the core of the small basket form dragging zones placed in front of each exhaust; the vertical portion of the draining or feeding tube for a bend to 90° under which is placed a motor of such form that its motive axis passes through the bend by a passing hole and it is axially housed within this portion of the tube, sealing the passing of the axis by means of a mechanical axis; the upper end of the motive axis within the feeding tube is joined, by the radial wide arms, to the inner of the bottom end of the rotary tube joined to the inner tub, thus, to works the motor the axis of this makes rotating the rotary tube together with the inner tube during the centrifuging cycle.

31. A washing system which uses a centrifuge pump to recirculating constantly the water of the washing tubs, between these and the same pump, according to claim 1, wherein, transversally to the suction pipes of the pump, is placed a radial blades series mounted on the end of the same impeller axis of the pump, and which are pressed by means of springs against other similar blade and against a plate with multiple perforations, which are fixed to the pipes.

50

55

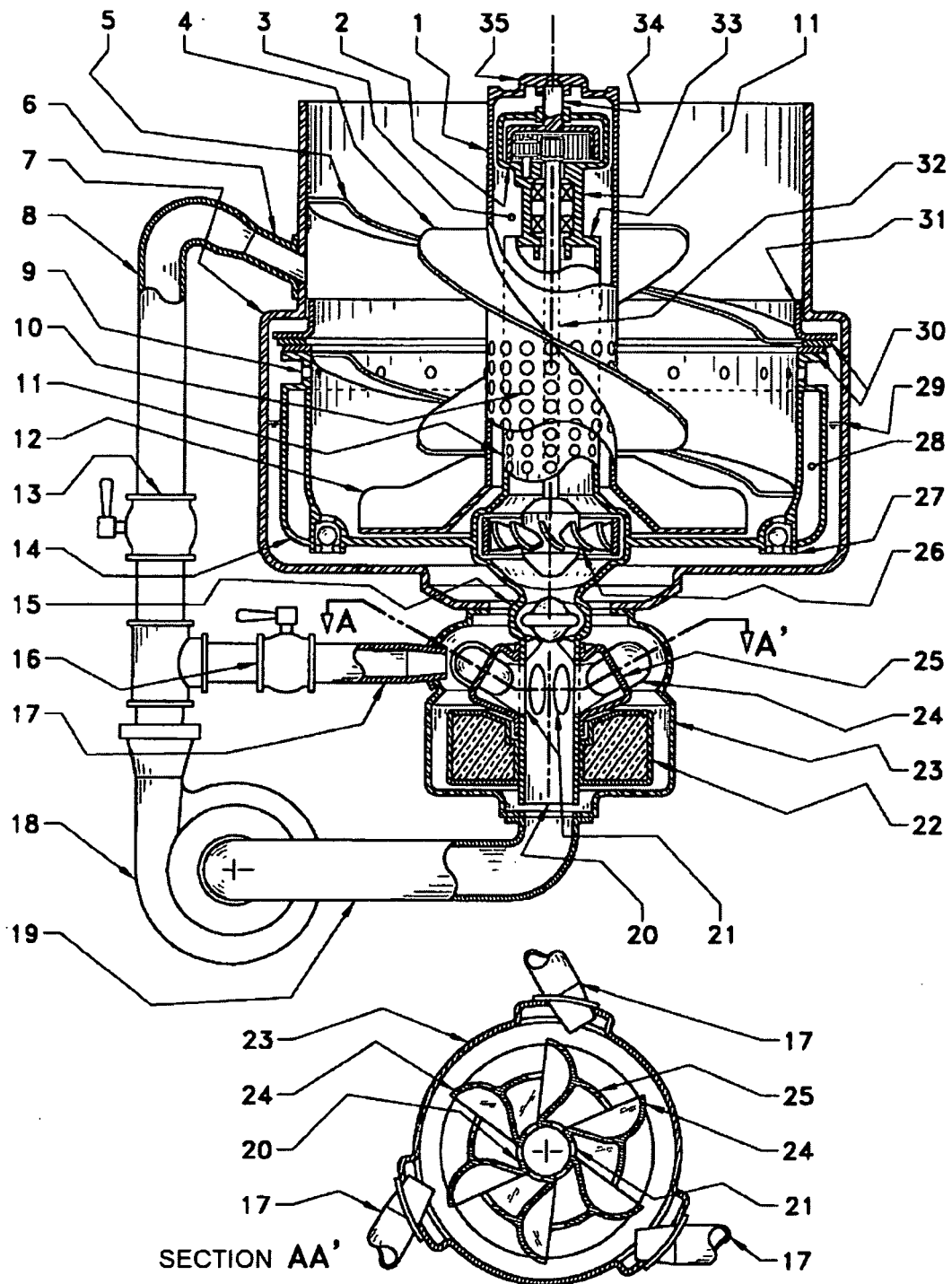


FIG. 1

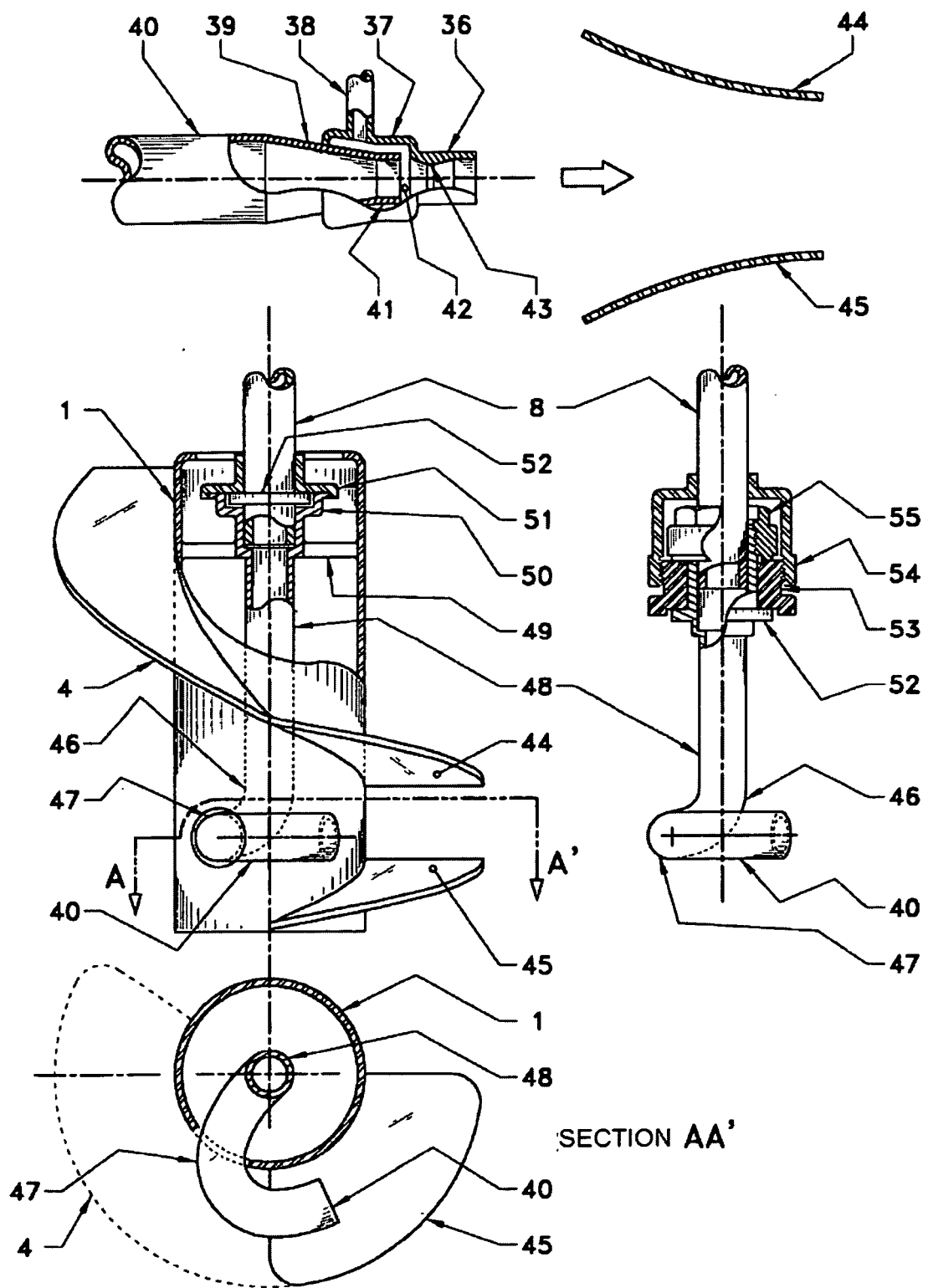


FIG. 2

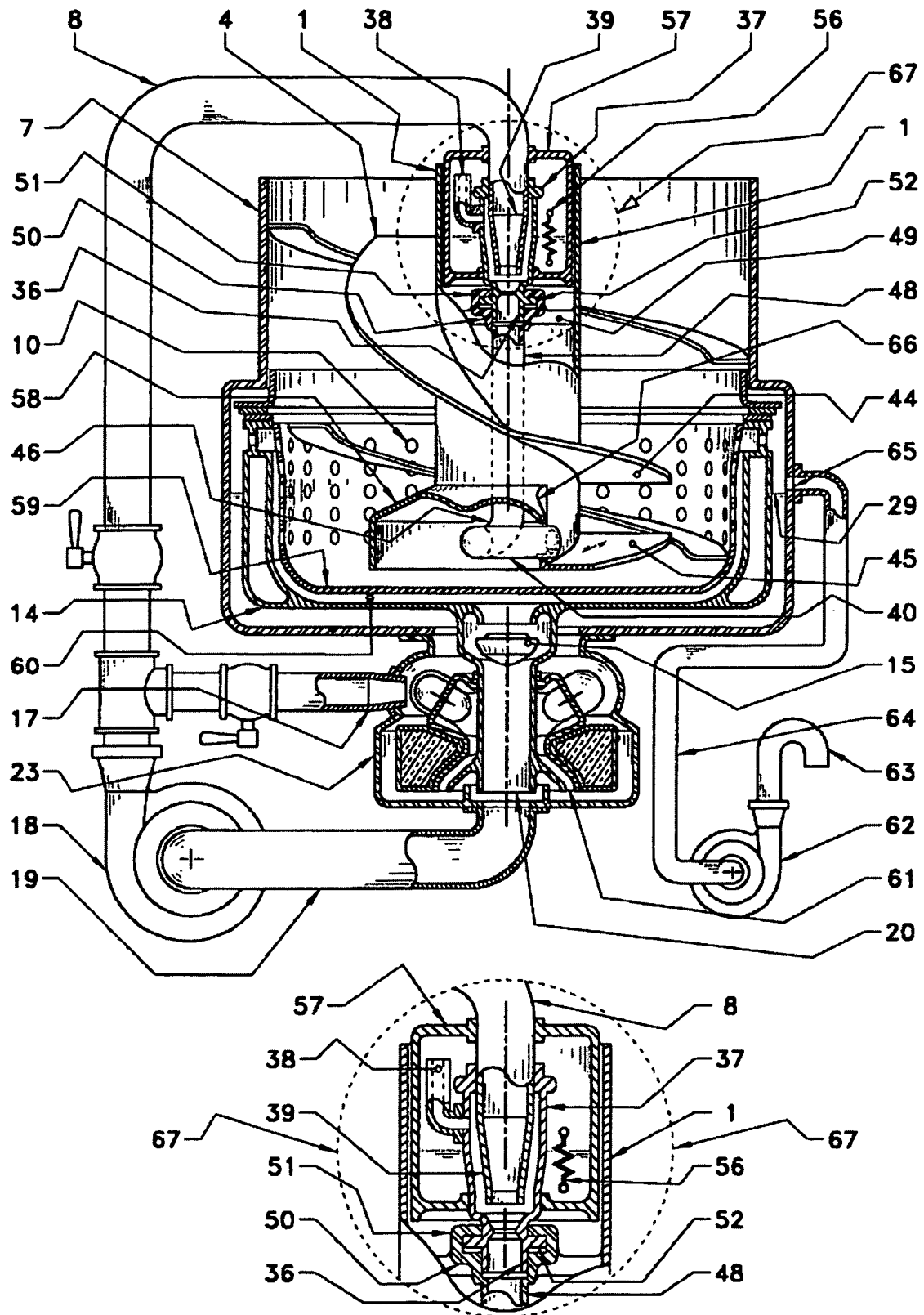


FIG. 3

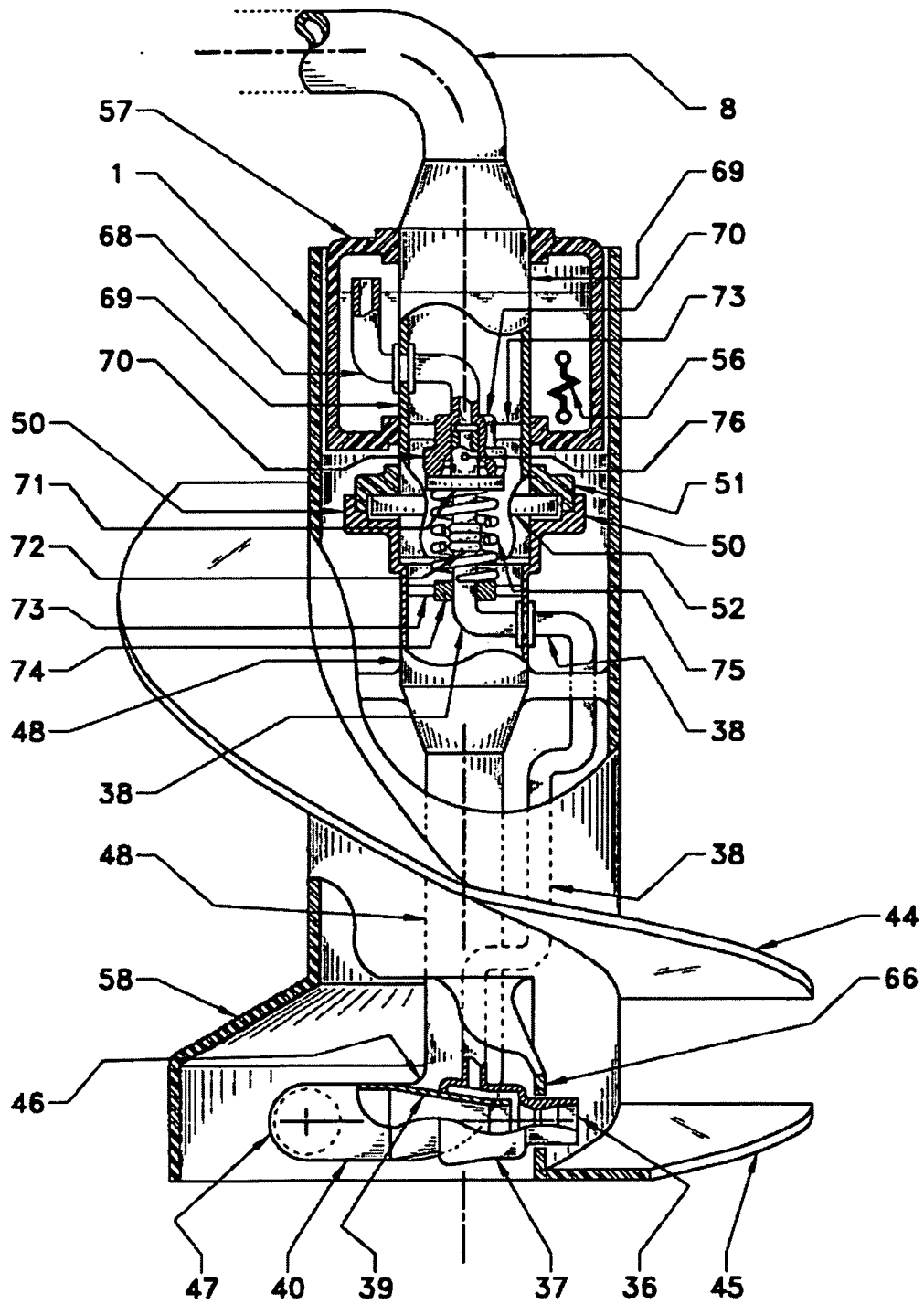


FIG. 4

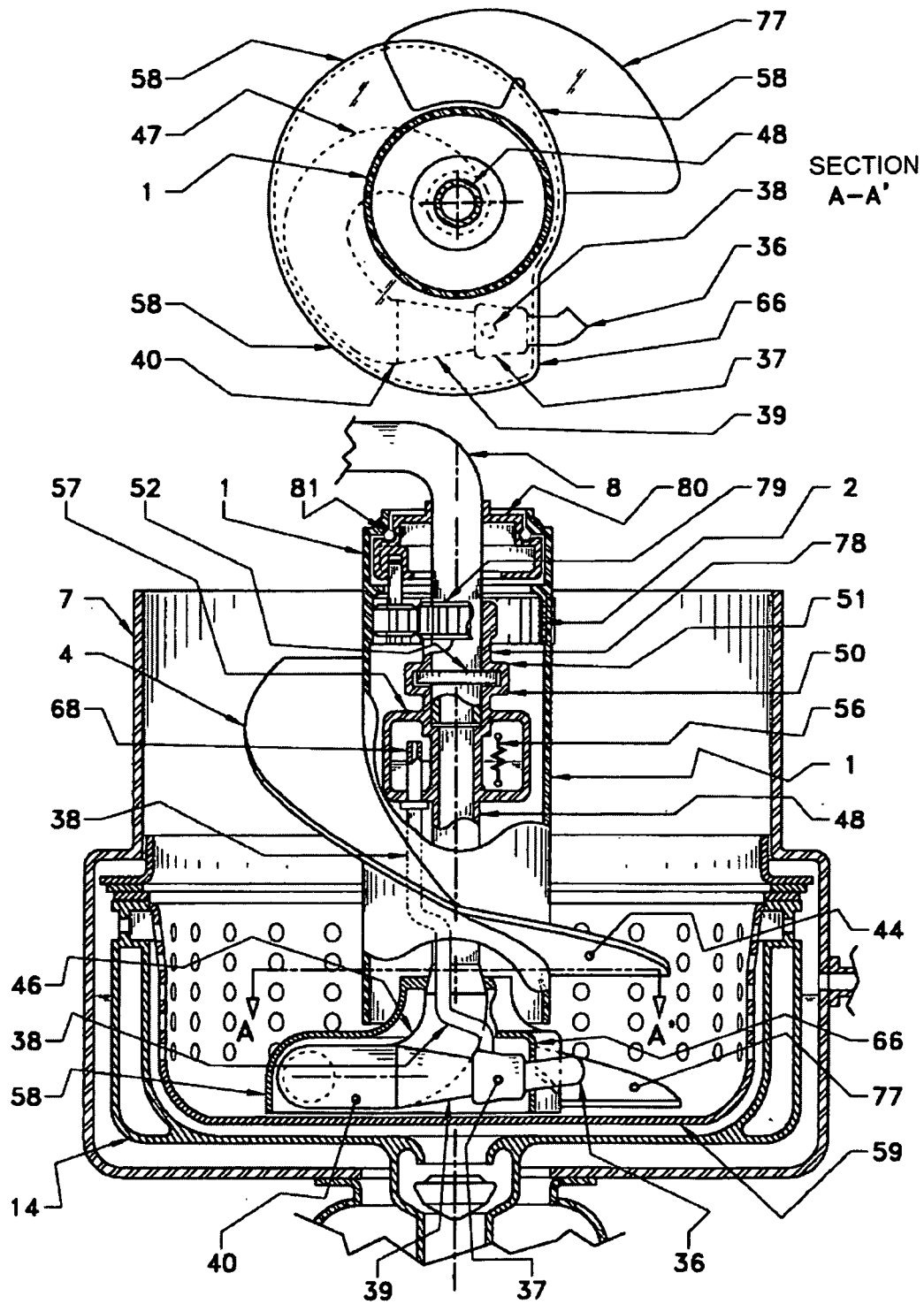


FIG. 5

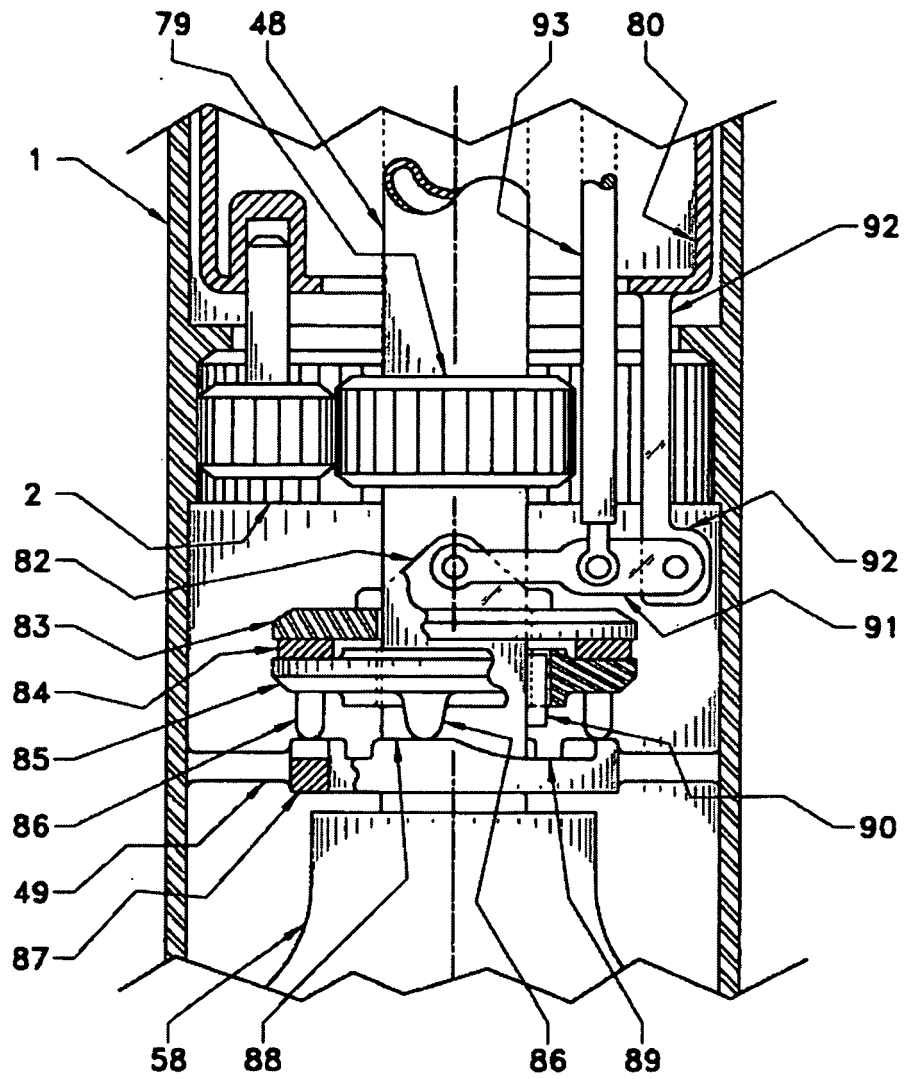


FIG. 6

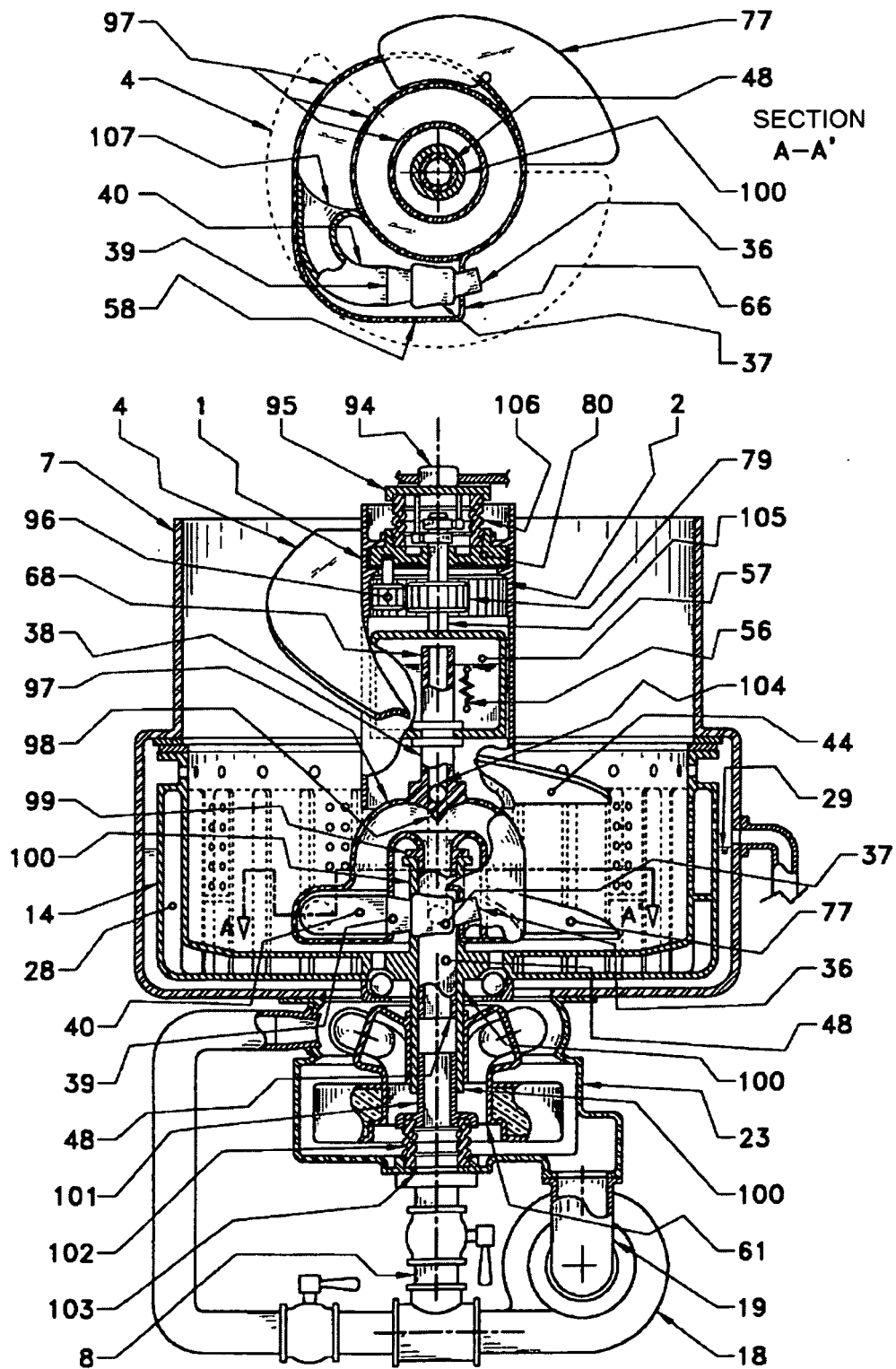


FIG. 7

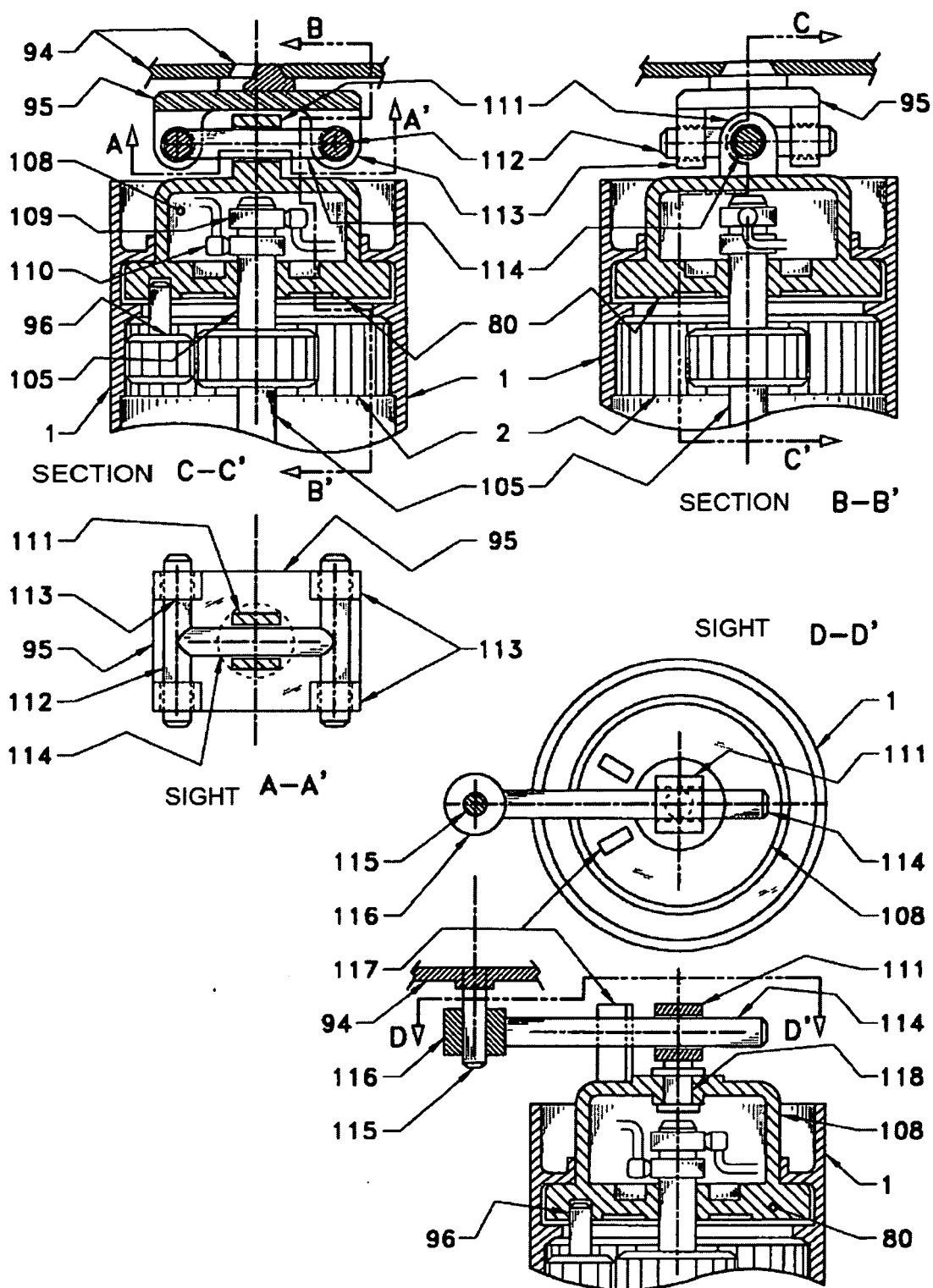


FIG. 8

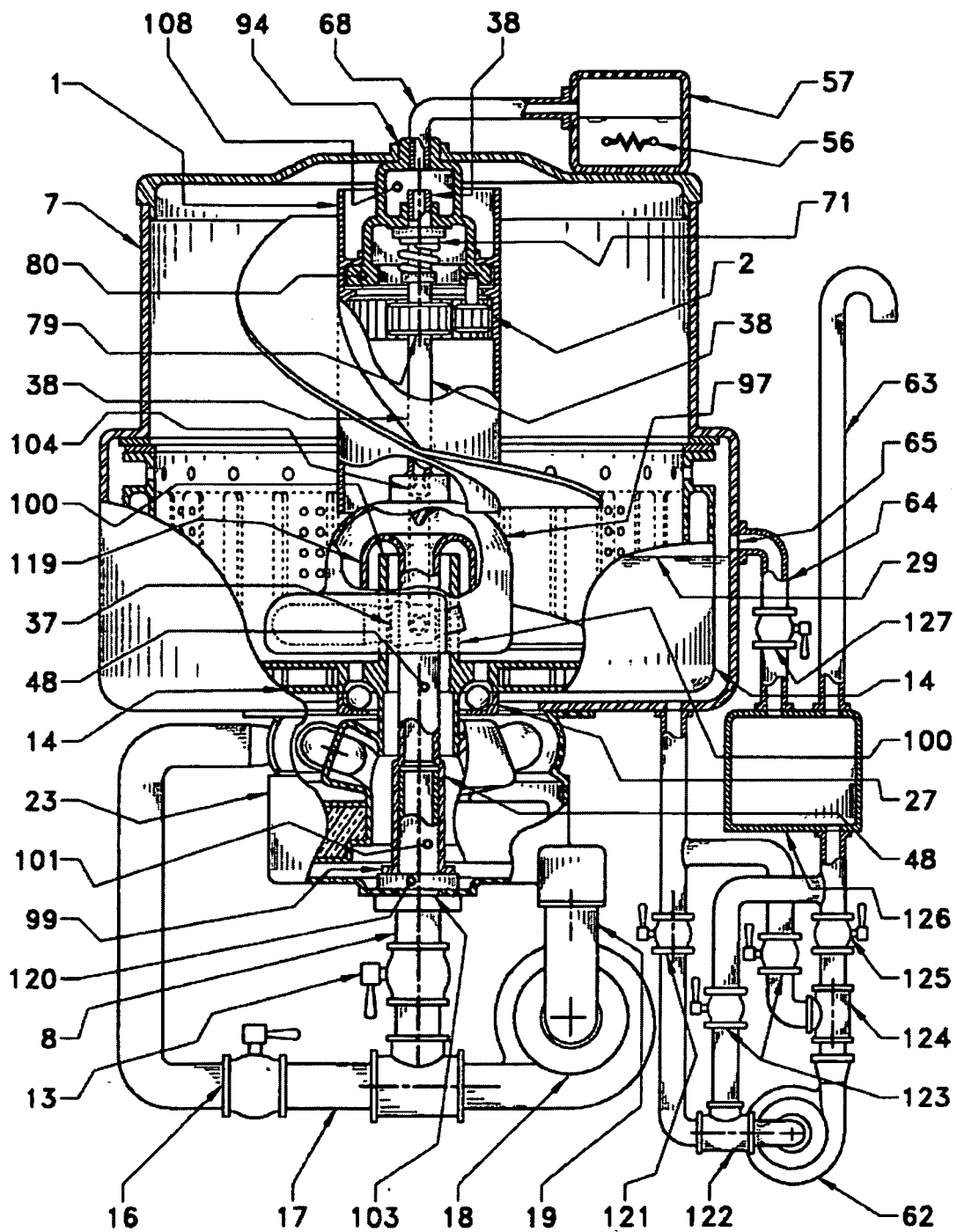


FIG. 9

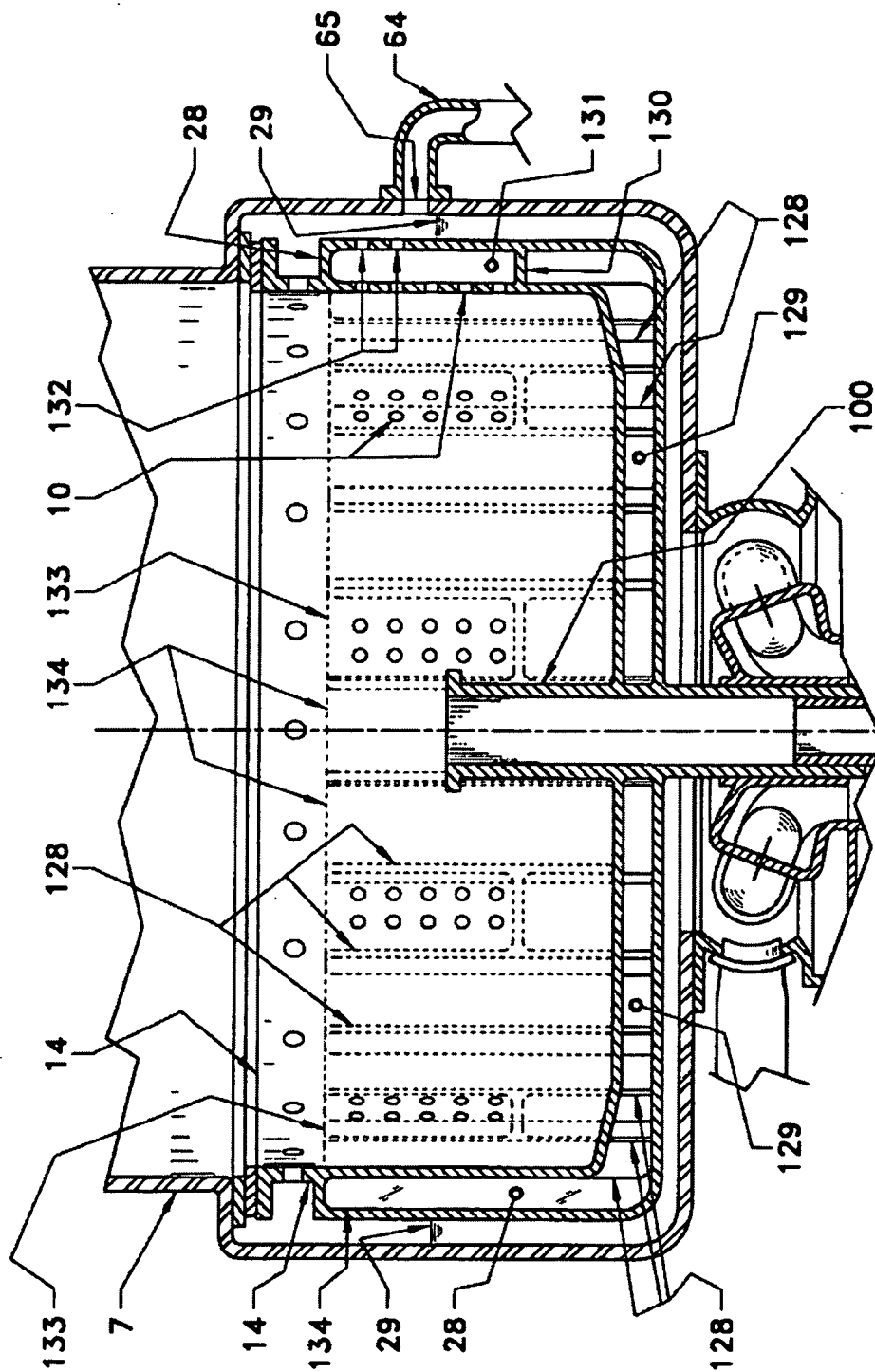


FIG. 10

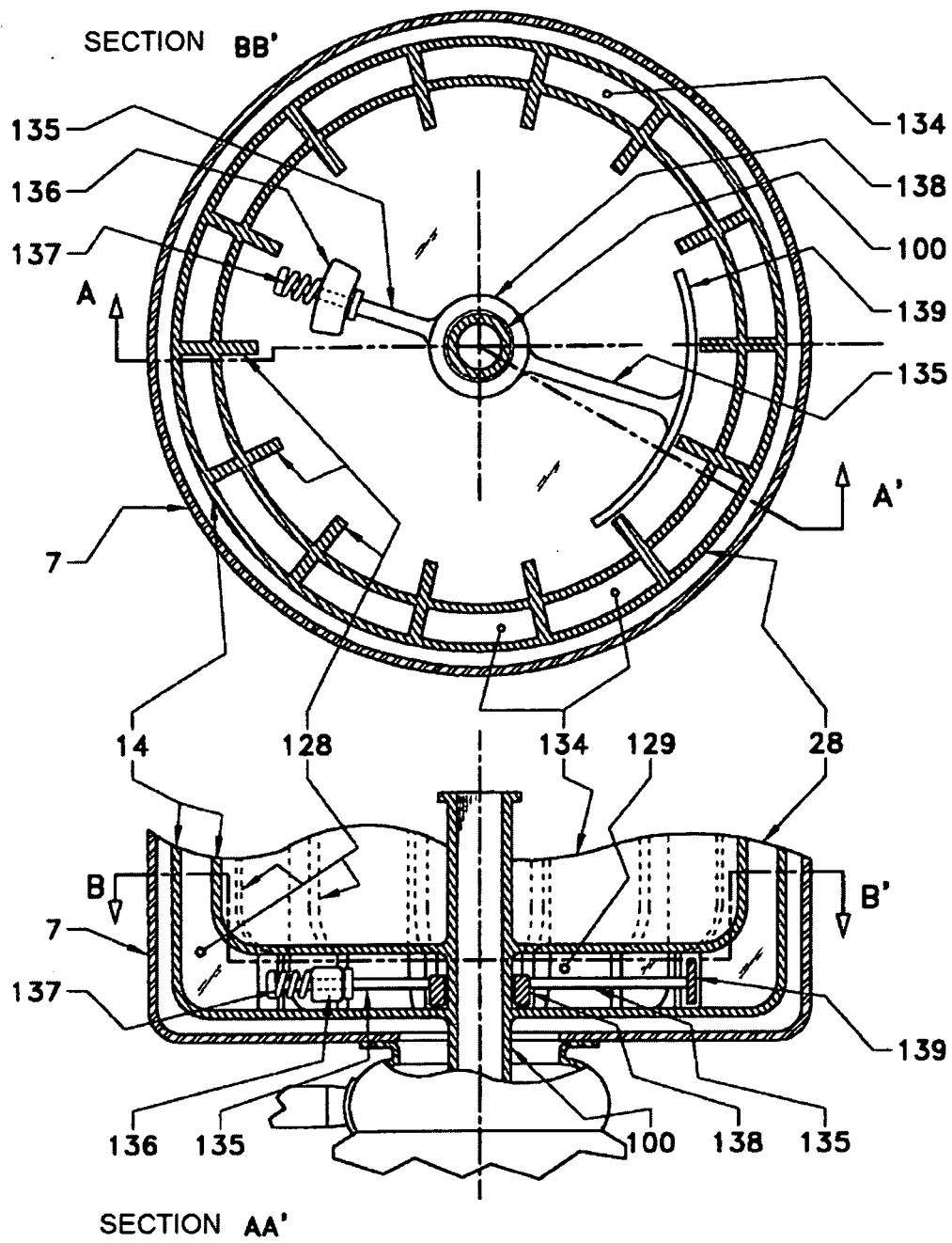
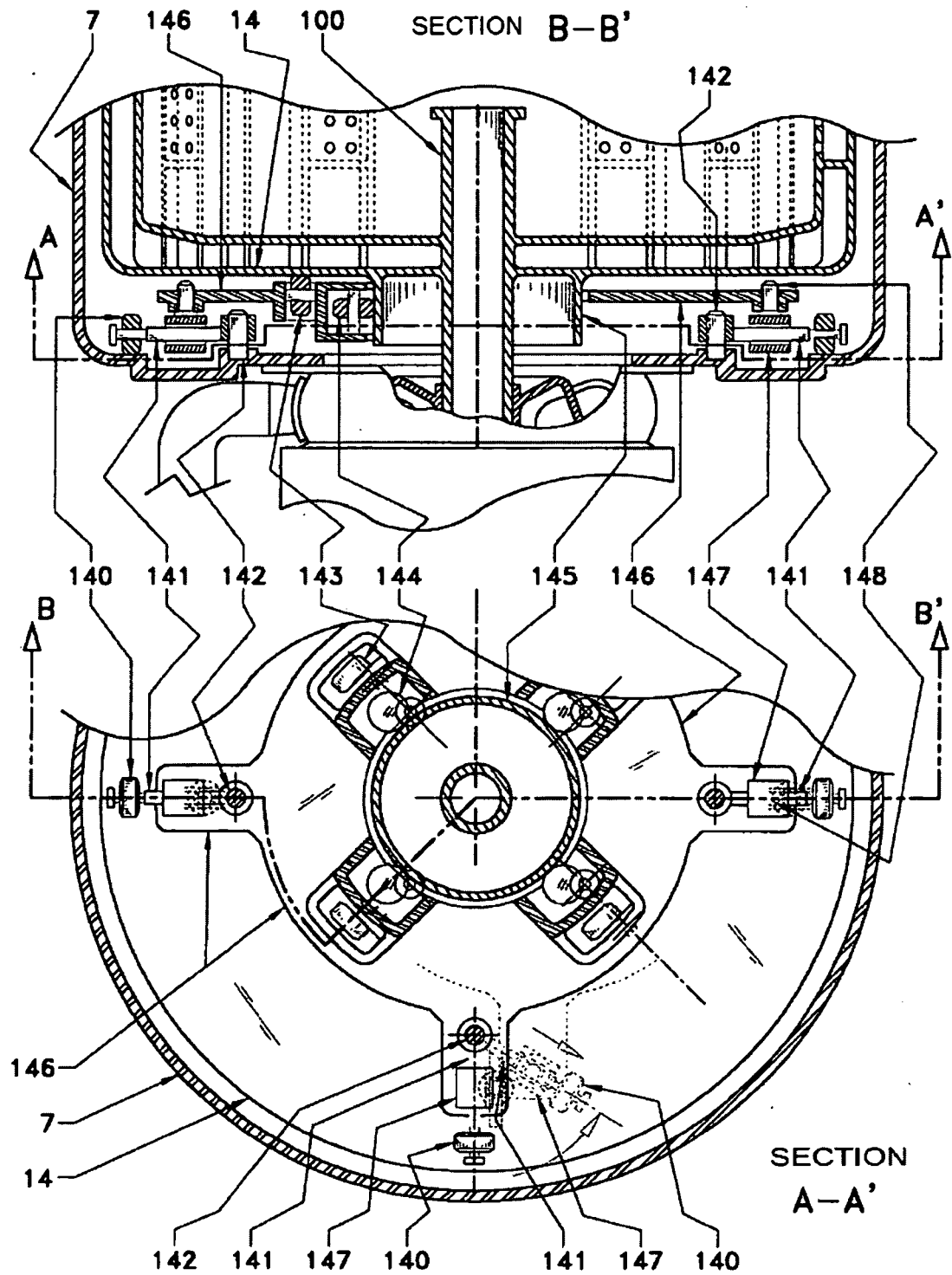


FIG. 11



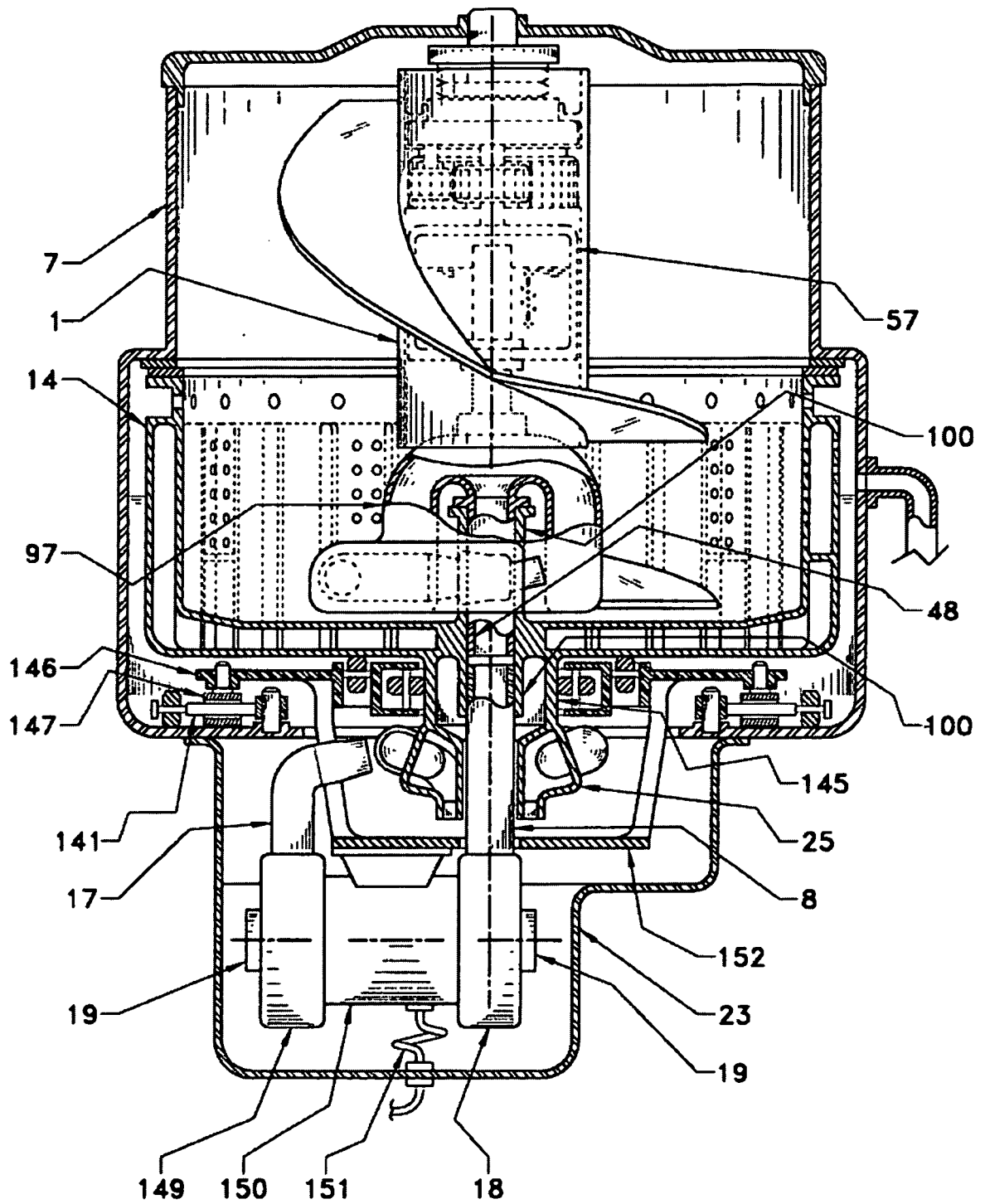
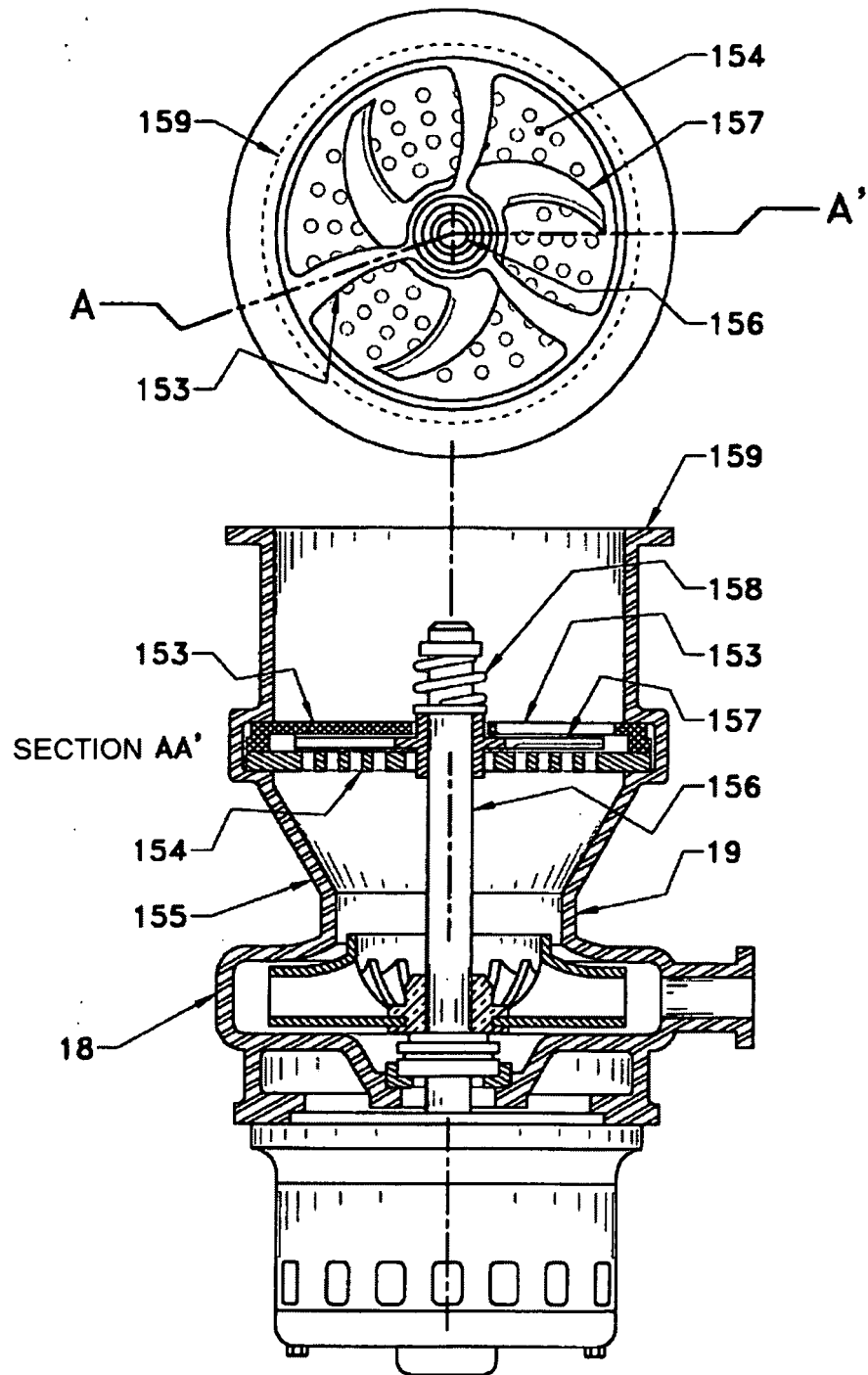
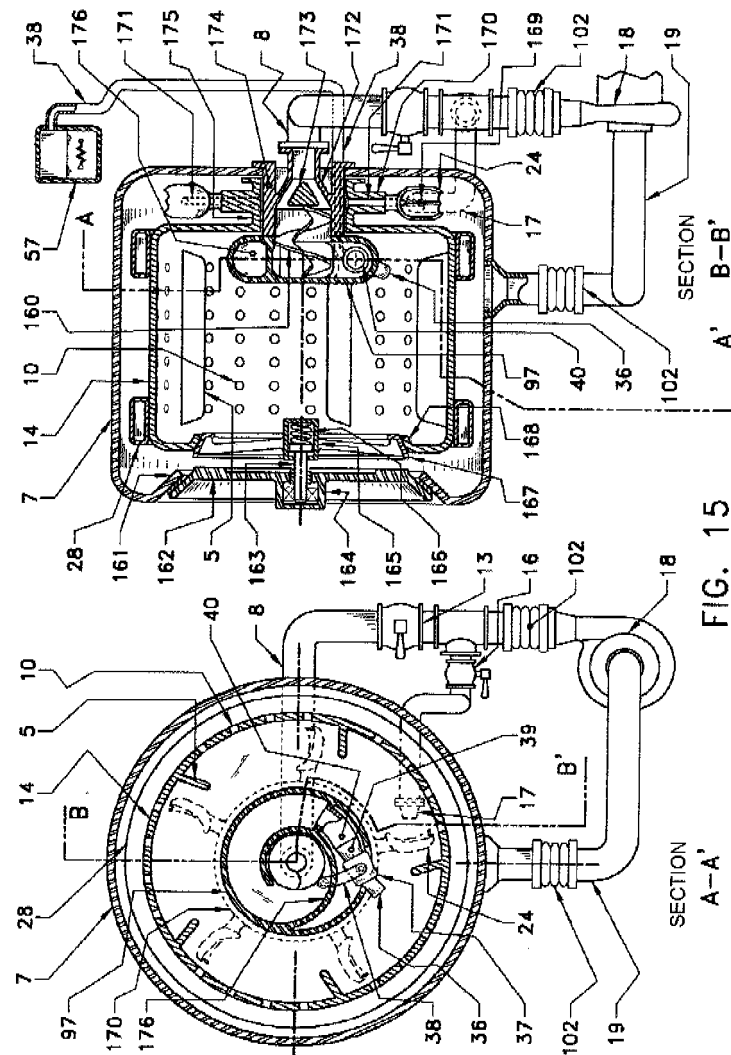
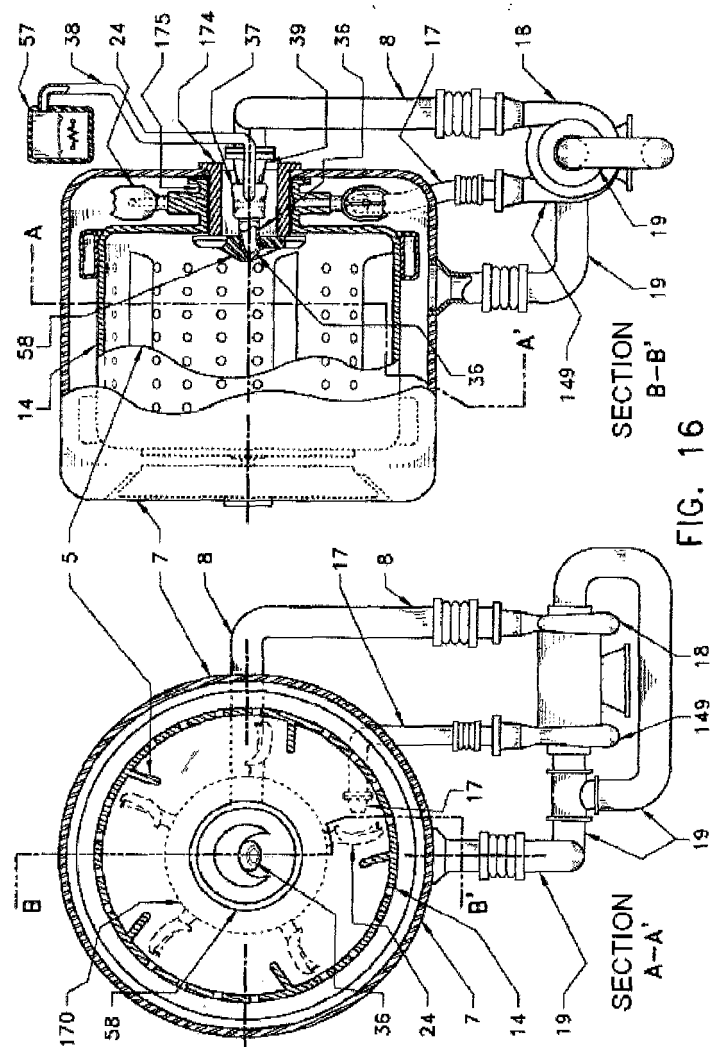


FIG. 13







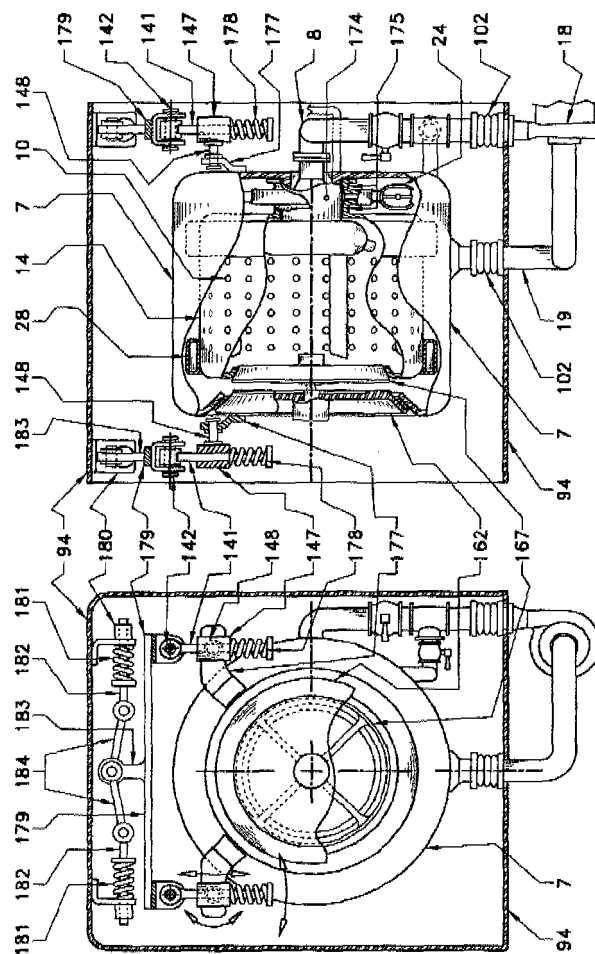


FIG. 17

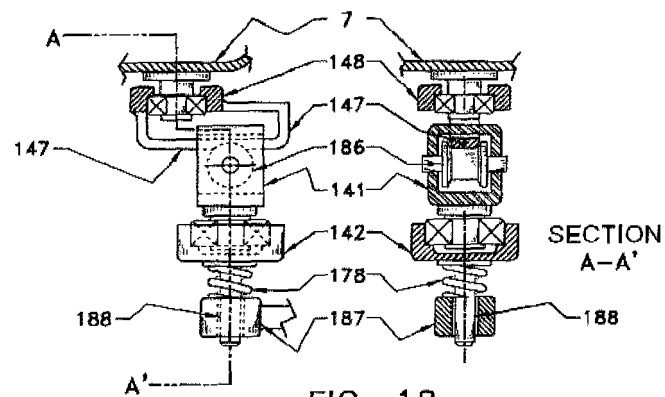
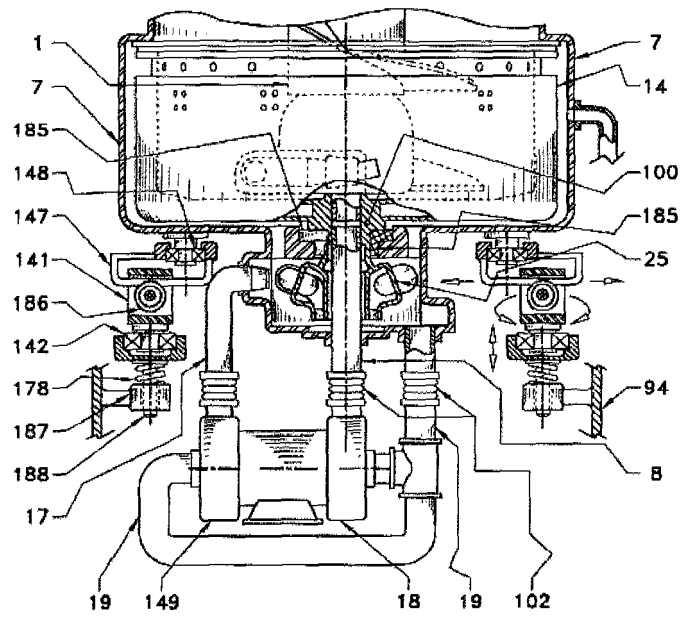


FIG. 18

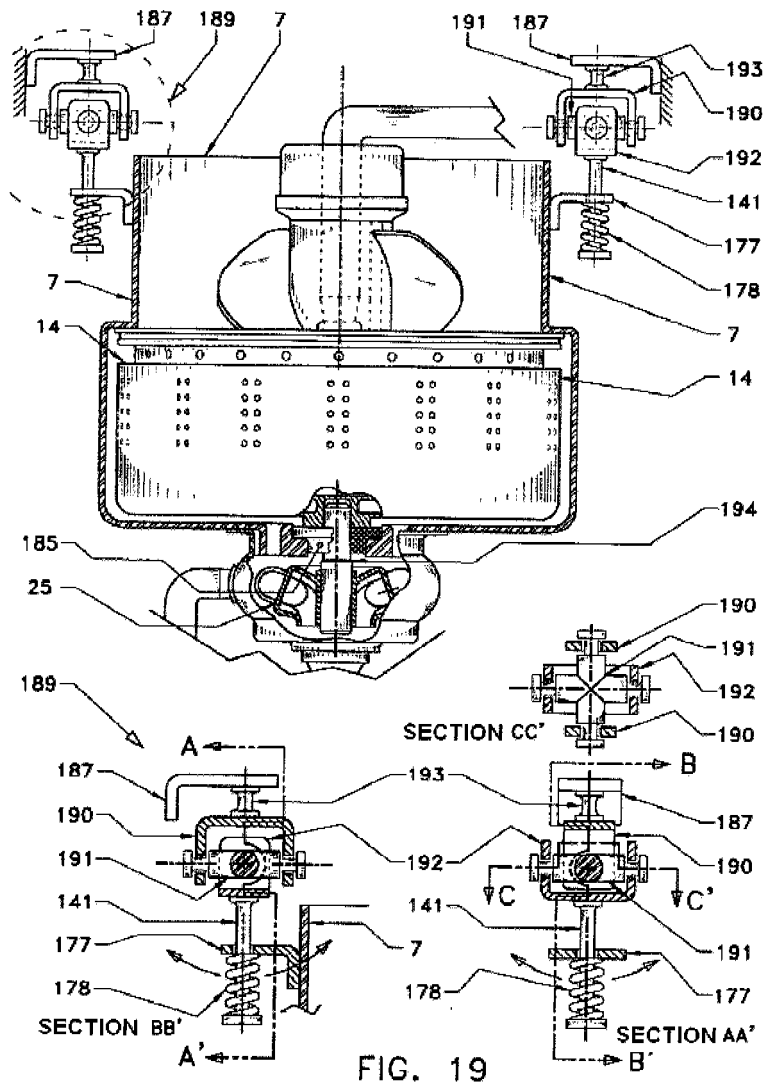


FIG. 19

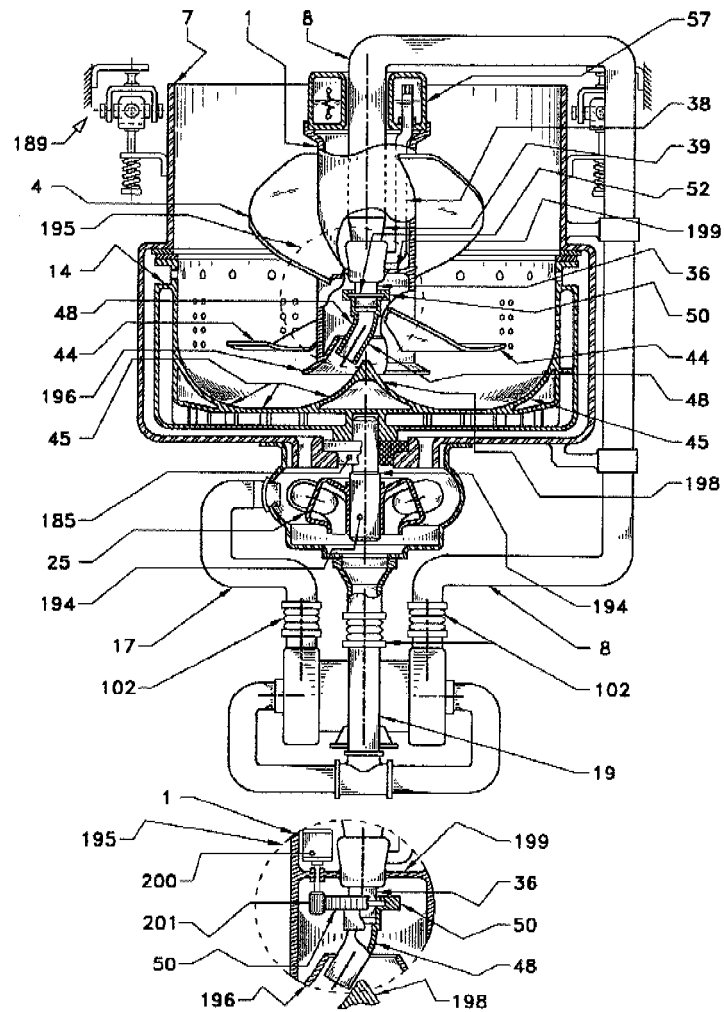


FIG. 20

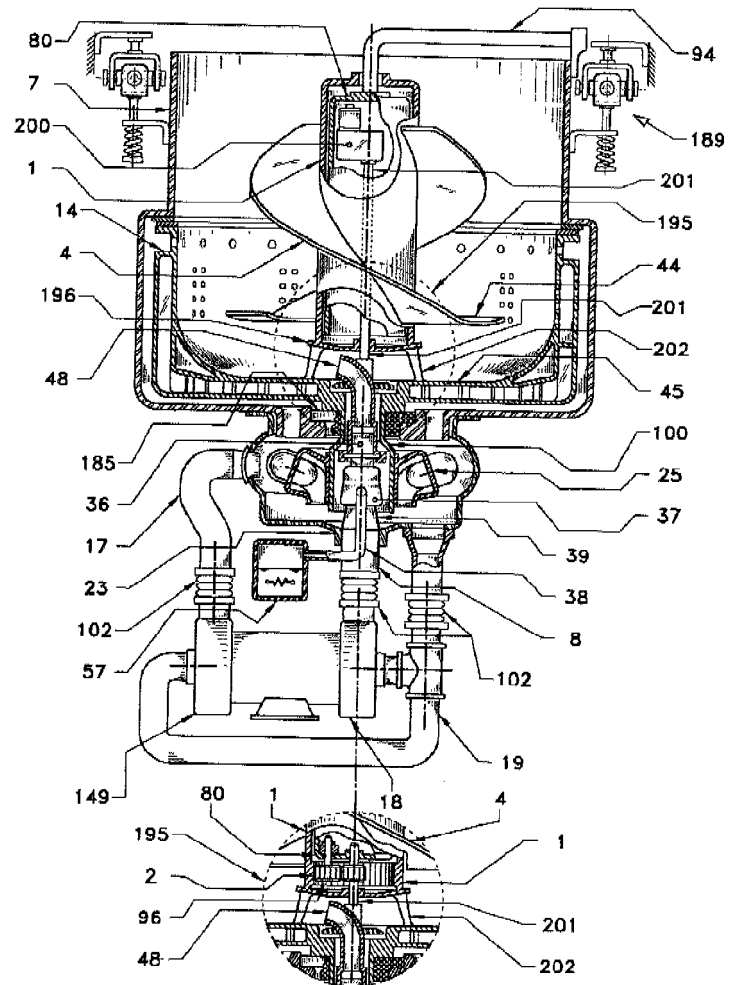
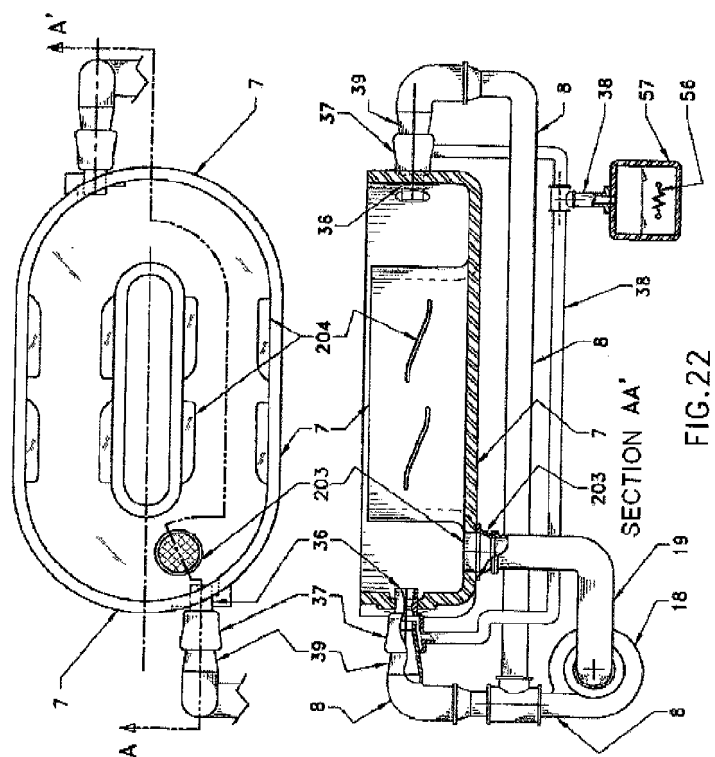
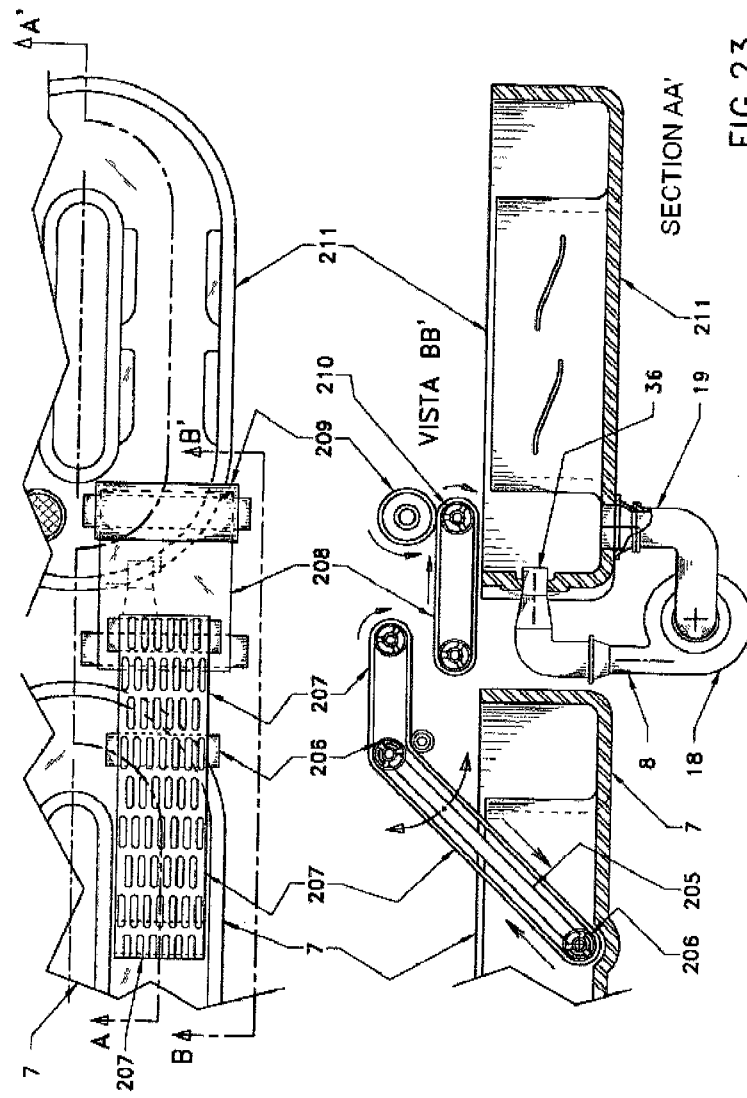
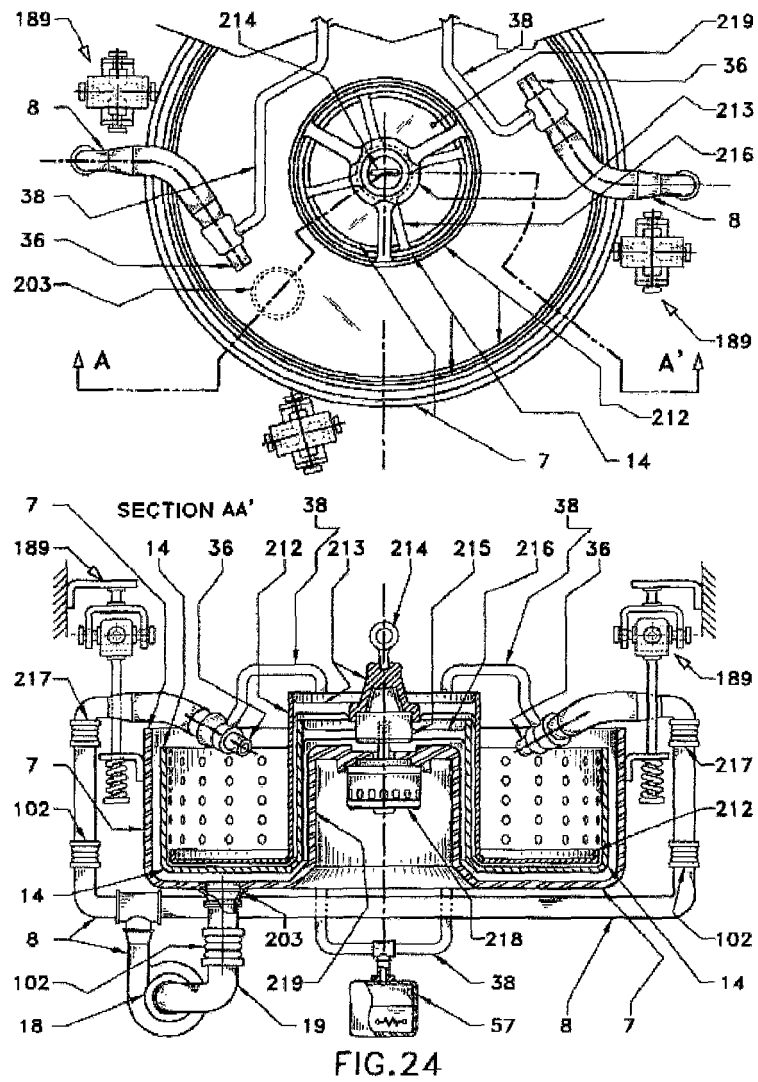
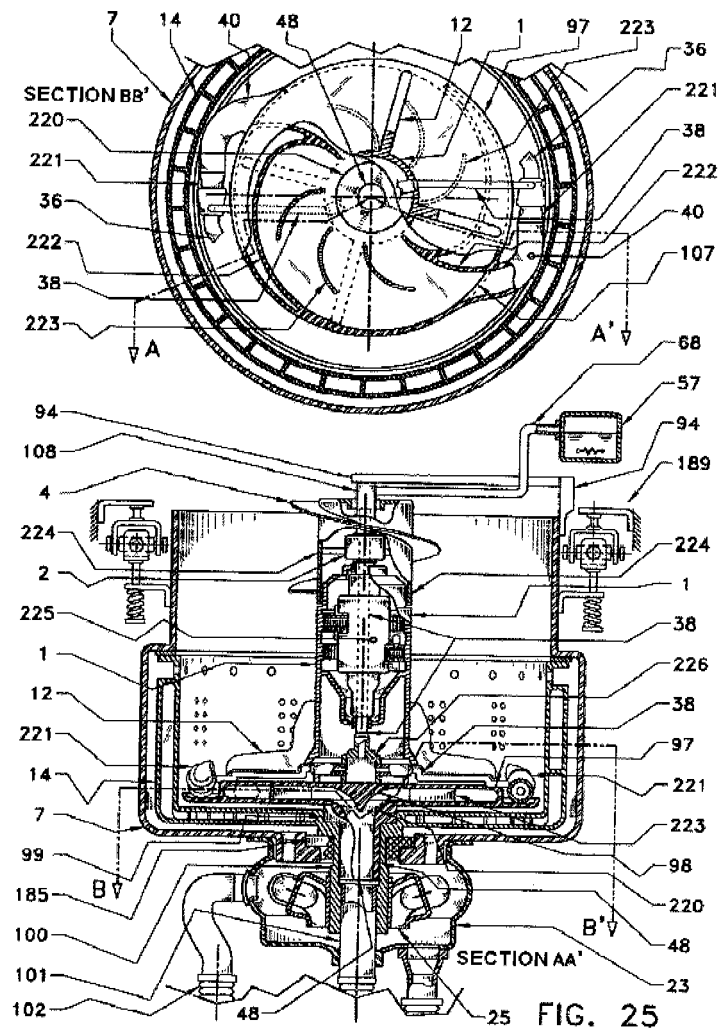


FIG. 21









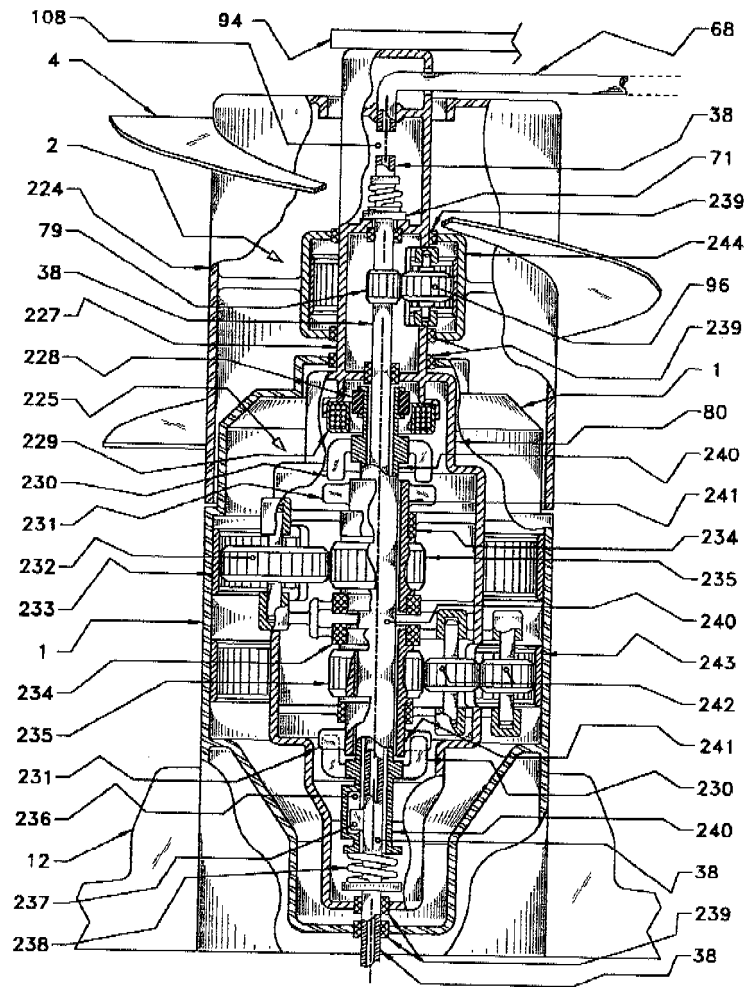
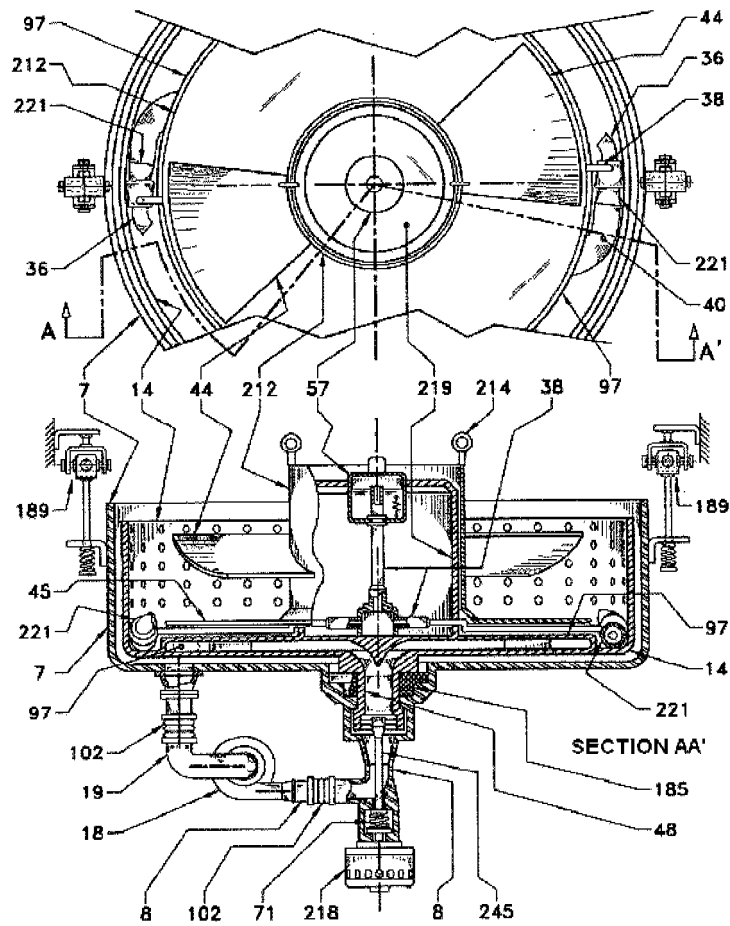


FIG. 26



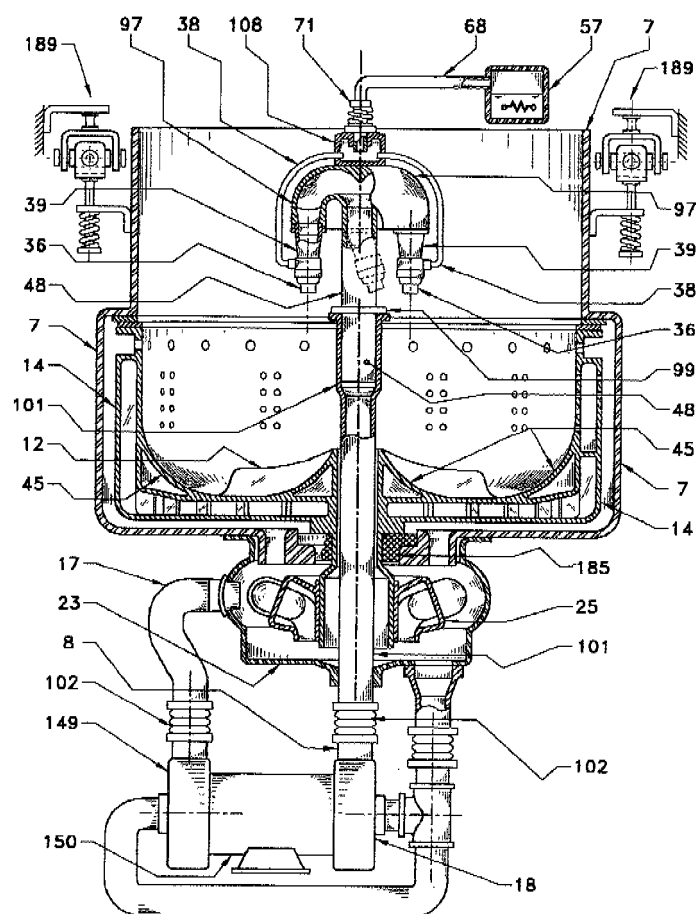


FIG. 28

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ MX 2009/000139

A. CLASSIFICATION OF SUBJECT MATTER

see extra sheet

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
d06f

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

INVENES, EPODOC, WPI

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5953939 A (GUERREO-PARRA et alii) 21.09.1999, the whole document.	1-31
A	US 2004/0255391 A1 (KIM et alii) 23.12.2004, the whole document.	1-31
A	US 2005/0034488 A1 (OH et alii) 17.02.2005, the whole document.	1-31
A	US 2008/0168805 A1 (KIM et alii) 17.07.2008, the whole document.	1-31
A	US 2008/0250822 A1 (AHN) 16.10.2008, the whole document.	1-31

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance.		
"E" earlier document but published on or after the international filing date		
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"O" document referring to an oral disclosure use, exhibition, or other means	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other documents, such combination being obvious to a person skilled in the art
"P" document published prior to the international filing date but later than the priority date claimed	"&"	document member of the same patent family

Date of the actual completion of the international search

29.April.2010 (29.04.2010)

Date of mailing of the international search report

(04/05/2010)

Name and mailing address of the ISA/
O.E.P.M.

Paseo de la Castellana, 75 28071 Madrid, España.

Facsimile No. 34 91 3495304

Authorized officer

M. Fluvia Rodríguez

Telephone No.

Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/ MX 2009/000139

Patent document cited in the search report	Publication date	Patent family member(s)	Publication date
US 5953939 A	21.09.1999	MX 9504040 A	29.03.1997
US 2004255391 A	23.12.2004	EP 1469120 A EP 20040008896 CN 1537995 A CN 1308529 C KR 20040088884 A JP 2004313793 A CN 1818189 A CN 1818191 A EP 1746197 A EP 20060022438 EP 1746196 A EP 20060022437 CN 101003939 A US 2007169521 A US 2007169280 A EP 1942221 A EP 20080004006	20.10.2004 14.04.2004 20.10.2004 04.04.2007 20.10.2004 11.11.2004 16.08.2006 16.08.2006 24.01.2007 14.04.2004 24.01.2007 14.04.2004 25.07.2007 26.07.2007 26.07.2007 09.07.2008 14.04.2004
US 2005034488 A	17.02.2005	CN 1580370 A CN 100357514 C EP 1507030 A EP 20040000292 US 7406842 B KR 20050017483 A KR 20050051480 A KR 100860027 B CN 101165261 A US 2008250824 A	16.02.2005 26.12.2007 16.02.2005 09.01.2004 05.08.2008 22.02.2005 01.06.2005 25.09.2008 23.04.2008 16.10.2008
US 2008168805 A	17.07.2008	KR 20060120827 A KR 20060120826 A KR 20060120825 A AU 2006250246 A AU 2006250246 B WO 2006126803 A DE 112006000052 T CN 101180428 A RU 2367736 C RU 2007147996 A	28.11.2006 28.11.2006 28.11.2006 30.11.2006 09.07.2009 30.11.2006 04.10.2007 14.05.2008 20.09.2009 27.06.2009
US 2008250822 A	16.10.2008	WO 2006101377 A AU 2006225405 A AU 2006225405 B KR 20060102952 A KR 100808176 B DE 112006000051 T EP 1863968 A EP 20060732701 CN 101184885 A	28.09.2006 28.09.2006 02.07.2009 28.09.2006 29.02.2008 25.10.2007 12.12.2007 24.03.2006 21.05.2008

Form PCT/ISA/210 (patent family annex) (July 2009)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/ MX 2009/000139

Patent document cited in the search report	Publication date	Patent family member(s)	Publication date
		RU 2362850 C RU 2007139454 A	27.07.2009 27.04.2009

INTERNATIONAL SEARCH REPORT

International application No.

PCT/ MX 2009/000139

CLASSIFICATION OF SUBJECT MATTER

D06F 23/04 (2006.01)

D06F 37/24 (2006.01)

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US 5953939 A [0002]